

"MAXIMUM ENGINE POWER/TOP SPEED
NOT REACHED"

Keep to sequence	
Electric fuel pump	A03/1
Air-intake system	B01/1
Throttle-valve basic setting	N23/1
Throttle-valve switch, idle	N27/1
Full-load enrichment/ overrun cutoff	N28/1
Solenoid-operated injection valves	A02/1
Control unit	A01/2

Continue:

	1					2					
	12345	67890	12345	67890	12345	678					

	SIS										

A	XXXXXX	XXXXXX	XXXXXX	XX							
B	XXXXXX	XXXXXX	XXXXXX	XXXXXX	XXXXXX	XXX					
C	XXXXXX	XXXXXX	XXXXXX	XXXXXX	XXXXXX	XXX					
D	XXXXXX	XXXXXX	XXXXXX	XXXXXX	XXXXXX	XXX					
E	XXXXXX	XXXXXX	XXXXXX	XXXXXX	XXXXXX	XX					
F											
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L											
M											
N										X XXX	

	12345	67890	12345	67890	12345	678					
		1		2							

Continue: A02/1

STRUCTURE OF MICROCARD

The user prompting appears on every page, e.g.:

- Continue: B17/1
- Continue: B18/1 Fig.: B17/2
- Yes: B18/1 No: B15/1
- Yes: B17/1 No: B16/1 Fig.: B15/2

.../1 = upper coordinate half

.../2 = lower coordinate half

Continue: A01/1

SPECIAL FEATURES

These instructions describe repairs to in-line pumps of series

PE(S)..H.. (control-lever pump)

without governor positioner and supply pump.

Refer to appropriate instructions for repairing of respective governor positioner and testing of injection-pump assembly.

Continue: A03/2

SPECIAL FEATURES

The control-lever pump - the "H" in the type designation stands for plunger-and-barrel assemblies with control lever - is a new development. In conjunction with the flange-mounted governor positioner this series is the main component of the EDC system (Electronic Diesel Control) for regulating injected quantity and start of delivery.

The control-lever pump is available in two sizes:

RP 39, design code as of ..S 1,
plunger stroke 18 mm,
positioner RE 33

RP 43, design code as of ..S 1000,
plunger stroke 14 mm,
positioner RE 36

Continue: A04/1

SPECIAL FEATURES

Further special features of control-lever pump:

Depending on version, fuel inlet and return via EHAB (electro-hydraulic shut-off device) or via ELAB (electric shut-off device).

Both versions are part of the EDC safety system and perform an important function as redundant shut-off device.

Continue: A04/2

SPECIAL FEATURES

Function of EHAB:

The EHAB is a solenoid-controlled switching valve which operates in conjunction with the fuel supply pump.

In operating position (as of engine start) current is applied to the solenoid valve (actuation by EDC control unit) which is switched in such a manner that the pump suction gallery is filled via a supply pump, filter and EHAB.

Continue: A05/1

SPECIAL FEATURES

Function of EHAB:

On shutting off the engine (EHAB deenergized) the solenoid valve reverses the direction of fuel flow. The supply pump then draws fuel off from the pump suction gallery, filling of the plunger-and-barrel assemblies is rapidly interrupted and the engine shut off.

The EDC safety system triggers this function in the event of a serious fault (e.g. control rod sticking) so as to shut off the engine immediately.

Continue: A05/2

SPECIAL FEATURES

Function of ELAB:

The ELAB is also a solenoid-controlled switching valve in the inlet to the pump suction gallery. In operating position (as of engine start) current is likewise applied to this valve (actuation by EDC control unit) which opens up the inlet to the suction gallery.

If shut-off is effected by the EDC safety system, the valve is reversed and connects the fuel inlet directly to the return. Filling of the plunger-and-barrel assemblies is thus interrupted and the engine shut off.

Continue: A06/1

GENERAL

The two pump sizes RP 39 and RP 43 are identical in terms of design and function and differ merely as regards the dimensioning of certain components.

Allowance is made in the corresponding sections of the repair instructions for any differences in procedure brought about by various sizes.

Continue: A06/2

GENERAL

When repairing the fuel-injection pump, parts which are damaged or worn are always to be renewed.

As regards testing of individual parts refer to section "COMPONENT CHECKING AND REPAIR", Coordinate D02/1

Parts which are removed and stored for lengthy periods are to be covered and protected against dirt/rust.

All parts are to be handled with extreme care whilst maintaining utmost cleanliness.

Continue: A07/1

GENERAL

Take care to ensure that the service parts installed are the correct ones as indicated in the spare parts list for the pump version concerned. The determination of service parts in line with a part number established on removal can lead to errors.

Always renew all sealing elements on repair. Apply tallow to seal rings.

Continue: A08/1

SAFETY MEASURES

Component cleaning: Wash out in commercially available cleaning agent such as Chlorothene NU, which is not readily flammable, and blow out with compressed air.

Skin protection: In order to avoid the possibility of skin irritation when handling calibrating oil, oils and greases, apply hand cream before starting work and wash hands in soap and water when finished.

Continue: A08/2

SAFETY MEASURES

Safety precautions for handling flammable liquids:

* In Germany:

Order Governing Work with Flammable Liquids (VBF) as issued by the Federal Ministry of Labor (BmA).

Safety regulations for handling chlorinated hydrocarbons:

- companies: ZH 1/222
- employees: ZH 1/129

as published by the Hauptverband für gewerbliche Berufsgenossenschaften (Zentralverband für Unfallschutz und Arbeitsmedizin),
Langwardweg 103, 55129 Bonn.

Continue: A09/1

SAFETY MEASURES

Safety regulations when handling flammable liquids (continued):

*** In all other countries:**

In all other countries the local regulations are to be observed.

Continue: A09/2

SAFETY MEASURES

When repairing fuel-injection pump, exclusive use is to be made of the special tools and testers indicated and illustrated in these instructions.

If use is made of incorrect and/or unsuitable tools and testers, the danger of injury cannot be precluded and products/parts may be damaged. This applies in particular to the roller tappets. Employing the wrong procedure/tools may result in sudden plunger spring relaxation and cause injury.

Continue: N27/1

TESTERS, FIXTURES AND TOOLS

The following list indicates all the testers and tools - both new and existing tools (for other pump versions) - required for repairing control-lever pumps.

In the case of existing tools previously ordered using the type designation, the designation is indicated in brackets.

Commercially available tools are not listed.

Continue: A10/2

TESTERS, FIXTURES AND TOOLS

- | | |
|--|------------------------------|
| * Swivel-type assembly frame for injection pumps | 0 986 611 248
(KDEP 2919) |
| With | |
| * - Support clamp for flange pumps | 0 986 611 358
(KDEP 2963) |
| * - Appropriate flange in line with pilot diameter | |
| * - Clamping device for flat and cradle mounting | 0 986 611 441
(KDEP 2985) |

Continue: A11/1

TESTERS, FIXTURES AND TOOLS

With:

* - Adapter for 0 986 612 649
clamping device
(set of 2)

* Drive coupling for:

- RP 39 (taper 40 mm):
Taper length 28 mm 1 685 702 075
Taper length 41 mm 1 685 702 076
(Flange version)
plus: hook wrench 1 687 950 530

Continue: A11/2

TESTERS, FIXTURES AND TOOLS

* Drive coupling for:

- RP 43 (taper 35 mm):
Taper length 28 mm 1 686 430 038
Taper length 36 mm 1 686 430 040
(Two-jaw type)

* Holding wrench for 0 986 611 084
two-jaw coupling (KDEP 2885)

* Guide pin 0 986 612 598
(set of 2)
for positioner disassembly

Continue: A12/1

TESTERS, FIXTURES AND TOOLS

- | | |
|--|---------------------------------|
| * Puller for
disk cam
(positioner) | 0 986 618 245
(KDMZ 6999) |
| * Extractor for
closure caps,
roller-tappet
retention holes | 0 986 611 668
(KDEP 1056) |
| With: | |
| * - Support sleeve | 0 986 611 976
(KDEP1056/0/8) |

Continue: A12/2

TESTERS, FIXTURES AND TOOLS

- | | |
|--|---------------|
| * Roller-tappet
holder
(part no. = 1 x) | 0 986 612 482 |
| * Socket wrench
for turning tappet-
holder eccentric shaft | 0 986 612 489 |
| * Extractor for
removing drive-end
shield | 0 986 612 505 |

Continue: A13/1

TESTERS, FIXTURES AND TOOLS

- | | |
|---|---------------|
| * Extractor for removing governor-end self-aligning roller bearing | 0 986 612 630 |
| * Disassembly tool for loosening wedge screw of prestroke control lever | 0 986 612 640 |
| * Assembly wrench for prestroke shaft bearing | 0 986 612 643 |

Continue: A13/2

TESTERS, FIXTURES AND TOOLS

- | | |
|--|------------------------------|
| * Assembly sleeve for protecting seal ring in prestroke shaft bearing | 0 986 612 639 |
| * Assembly tool for pretensioning roller tappets on removal/installation | 0 986 612 072
(KDEP 1556) |
| With: | |
| * Angle holder (set of 2) | 0 986 612 636 |

Continue: A14/1

TESTERS, FIXTURES AND TOOLS

With:

- | | |
|---|------------------------------|
| * Hand lever | 0 986 611 993
(KDEP 1505) |
| * Tappet forceps for
removing/installing
roller tappets | 0 986 611 298
(KDEP 2941) |
| * Assembly wrench for
removing control
sleeves | 0 986 611 738
(KDEP 1071) |
| * Extractor for
removing barrel-and-
valve assemblies | 0 986 612 397
(KDEP 1763) |

Continue: A14/2

TESTERS, FIXTURES AND TOOLS

- | | |
|--|------------------------------|
| * Socket wrench for
delivery-valve
holders (serration) | 0 986 611 451
(KDEP 2986) |
| * Assembly tool for
barrel-and-valve
assemblies | 0 986 611 356
(KDEP 2962) |
| * Pressing-off plate
for removing governor-
end bearing from
camshaft | 0 986 612 134
(KDEP 1580) |

Continue: A15/1

TESTERS, FIXTURES AND TOOLS

- * Pressing-out mandrel 0 986 612 648
for drive-end
roller bearing
- * Pressing-in tool 0 986 612 647
for drive-end
roller bearing

Continue: A15/2

TESTERS, FIXTURES AND TOOLS

- * Pressing-in tool 0 986 612 065
for governor-end (KDEP 1552)
bearing
(Note reworking instructions
at end of this Section)
- With:
- * - Guide bushing 0 986 612 493
for camshaft taper
20 mm and thread
M 14 x 1.5
- * - Adapter ring 0 986 612 646
for bearing
OD 82 mm

Continue: A16/1

TESTERS, FIXTURES AND TOOLS

- | | |
|--|------------------------------|
| * Centering mandrel
for repairing
roller tappets | 0 986 612 492 |
| * Pressing-in mandrel
for bottom
closure caps | 0 986 612 119
(KDEP 1574) |
| * Pressing-in mandrel
for closure caps of
roller-tappet
retention holes | 0 986 612 156
(KDEP 1598) |

Continue: A16/2

TESTERS, FIXTURES AND TOOLS

- | | |
|---|------------------------------|
| * Retaining pins
(set of 12)
for assembly plunger
(leak test) | 0 986 612 114
(KDEP 1571) |
| * Tensioner for
control-rod
return spring | 0 986 612 311
(KDEP 1704) |
| * Setting device for
adjusting prestroke
shaft/start of delivery
and checking position of
short-circuiting ring | 0 986 612 620 |

Continue: A17/1

TESTERS, FIXTURES AND TOOLS

* Measuring device 0 986 612 657
for adjusting prestroke
solenoid in RE positioner

Plus:

- Cover (with 0 986 612 676
threaded mount)
- Dial-indicator 1 688 130 030
holder
- Dial indicator 1 687 233 012
Range 30 mm
Graduations 0.01 mm

Continue: A17/2

TESTERS, FIXTURES AND TOOLS

* Directional-control 0 986 615 111
valve for reducing (KDJE-P-100/1.1)
pressure in leak
test (suction gallery)

Continue: A18/1

TESTERS, FIXTURES AND TOOLS

Reworking instructions for pressing-in tool 0 986 612 065 (KDEP 1552):

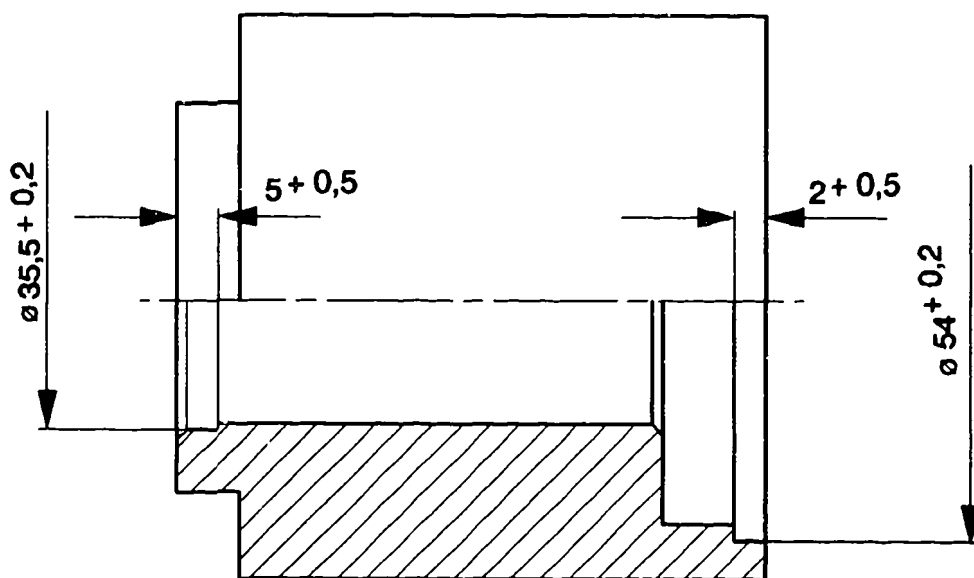
For use on camshafts with taper 35 mm and bearing OD 75 mm the above-mentioned tool is to be reworked to provide two additional recesses as shown.

(Note: tool is surface-hardened).

Allowance has already been made for this modification on tools supplied after these instructions were printed.

Continue: N27/1 Fig.: A18/2

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TEST SPECIFICATIONS

- * Leak test, suction gallery:
7 minutes pulsating 0...5 bar.
- * Leak test, camshaft chamber:
7 minutes 1.5 bar, then
1 minute 0.5 bar.
- * Axial clearance, prestroke shaft:
0.10...0.15 mm

Continue: N27/1

**ADHESIVES AND LUBRICANTS,
MATERIAL DESIGNATION**

- * Locking compound for Loctite 242
microencapsulated (blue,
screws after red bottle)
thread cleaning
- * Hot-bearing grease for
radial-lip-type oil
seal etc.:
 - Tube 45 ml: 5 700 002 005
 - Tube 225 ml: 5 700 002 025
- * Molycote grease for
roller tappets etc.:
Molycote M 55 Plus 5 903 060 000
or: 5 994 420 005

Continue: A20/2

**ADHESIVES AND LUBRICANTS,
MATERIAL DESIGNATION**

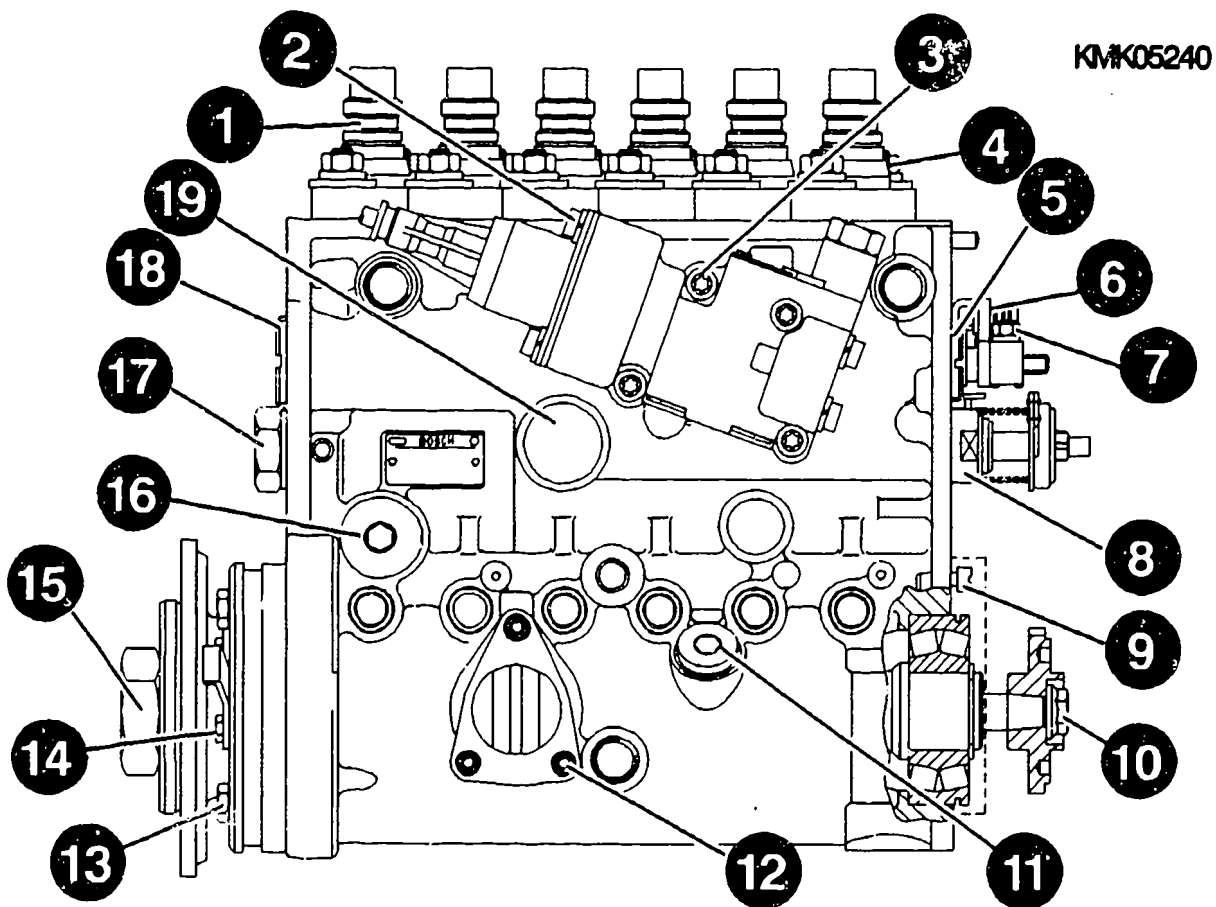
- * Tallow commercially
for seal rings available
- * Tallow/oil mixture 5 963 340 005
- * Silicone grease 5 700 080 125

Continue: N27/1

TIGHTENING TORQUES

1 = Delivery-valve holder, assembly diameter 11, 12 mm:	110...120	Nm
2 = Fastening screws, EHAB solenoid (2):	7...9	Nm
3 = Fastening screws, EHAB/ELAB:	7...9	Nm
4 = Fastening nuts, barrel-and-flange elements:	50...55	Nm
5 = Threaded sleeve, prestroke shaft bearing:	30...40	Nm
6 = Prestroke control- lever correction screw:	5...7	Nm
7 = Prestroke control- lever wedge screw:	6...7	Nm

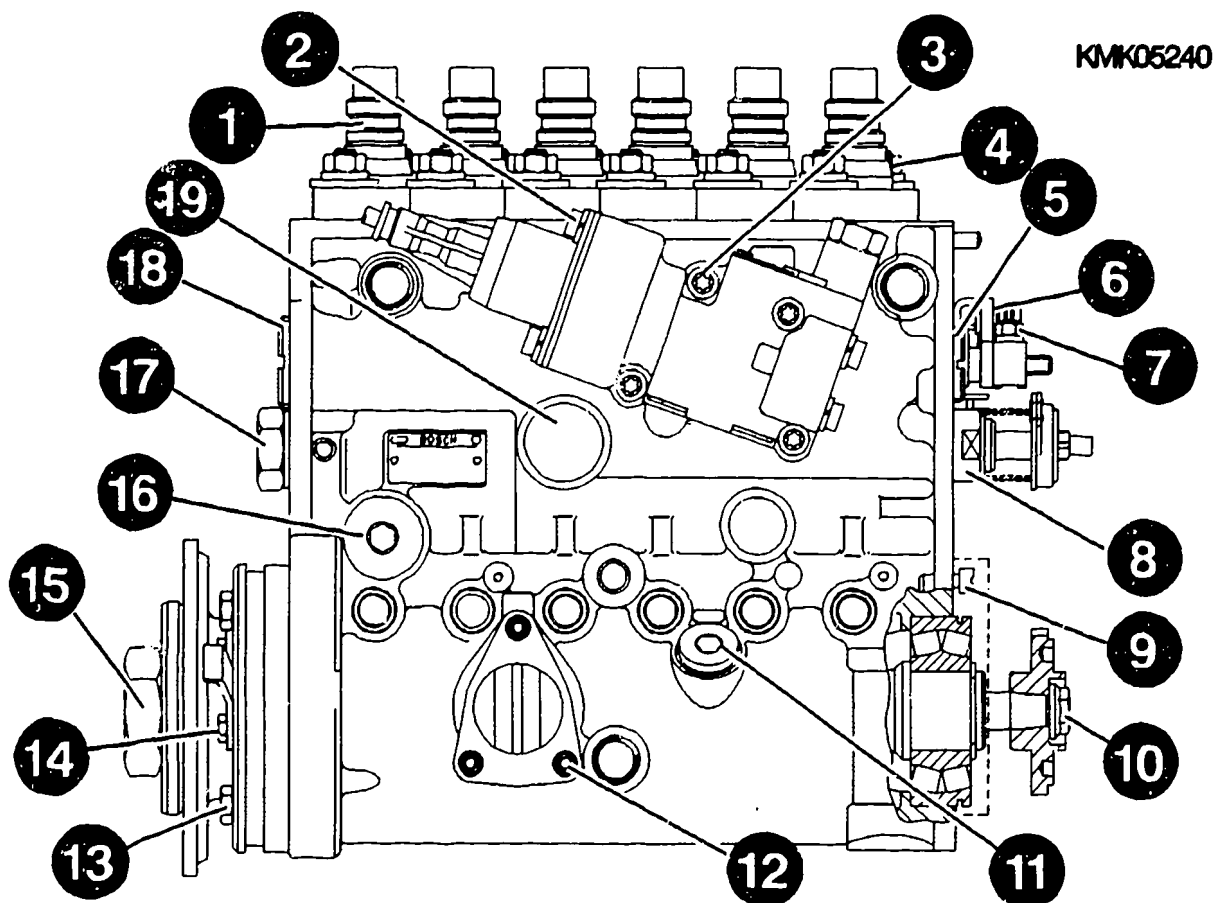
Continue: A22/1 Fig.: A21/2



TIGHTENING TORQUES

8 = Bushing - quantity control rod:	30...40	Nm
9 = Fastening screws, bearing flange:	7...9	Nm
10 = Fastening nut, disk cam:	90...100	Nm
11 = Oil check screw:	30...40	Nm
12 = Supply pump - stay bolts:	3.5...4.5	Nm
- nuts:	7...9	Nm
13 = Fastening screws, drive-end shield (M 8):	18...20	Nm
14 = Fastening screws, start-of-delivery marking plate:	7...9	Nm

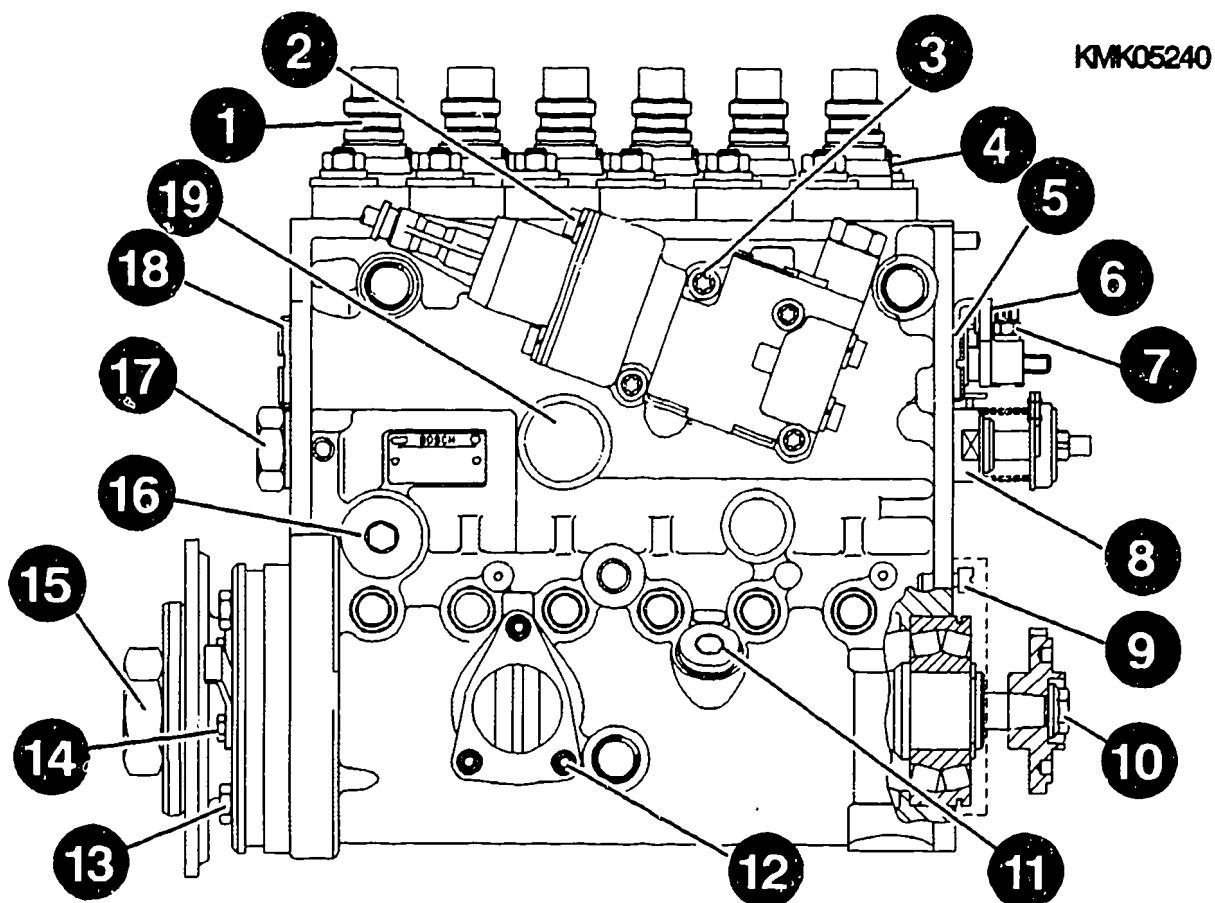
Continue: A23/1 Fig.: A22/2



TIGHTENING TORQUES

15 = Hexagon nut, drive coupling		
- Thread M 24 x 1.5:	340...370	Nm
- Thread M 30 x 1.5:	450...490	Nm
(for delivery with genuine coupling)		
16 = Screw plug, pre- stroke bore:	40...60	Nm
17 = Cap nut, control- rod guide:	40...60	Nm
18 = Threaded sleeve, prestroke shaft bearing:	30...40	Nm
19 = Fuel temperature sensor:	30...35	Nm

Continue: A24/1 Fig.: A23/2

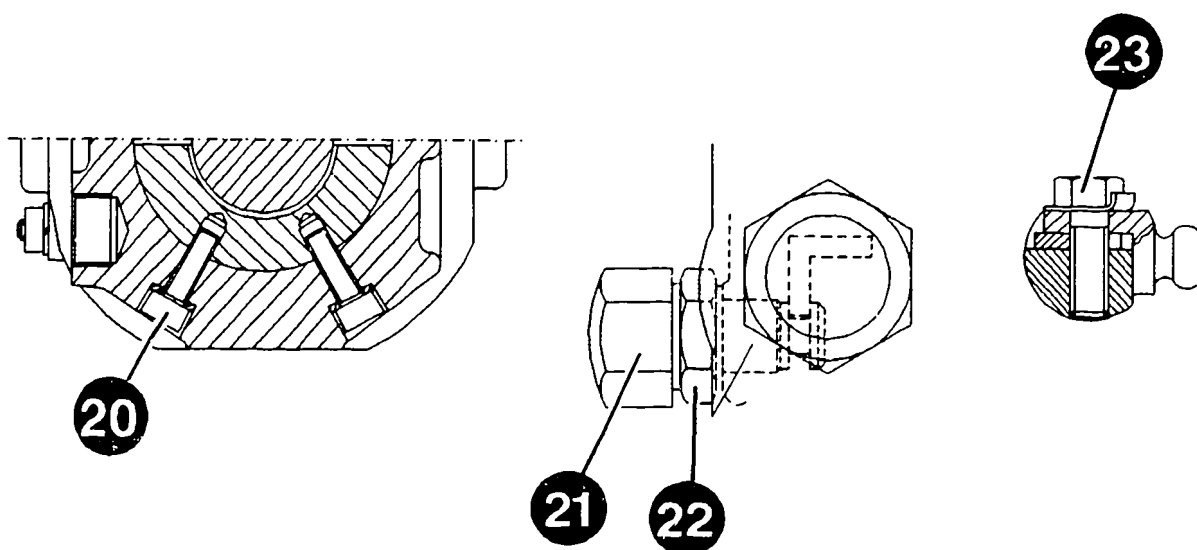


TIGHTENING TORQUES

20	= Fastening screws, camshaft intermediate bearing:	
	- Aluminum:	7...9 Nm
	- Bronze/steel:	8...10 Nm
21	= Cap nut, control- rod guide:	12...15 Nm
22	= Lock nut, control- rod guide:	15...18 Nm
23	= Fastening screw, pre- stroke shaft driver	5.5...6 Nm

Continue: N27/1 Fig.: A24/2

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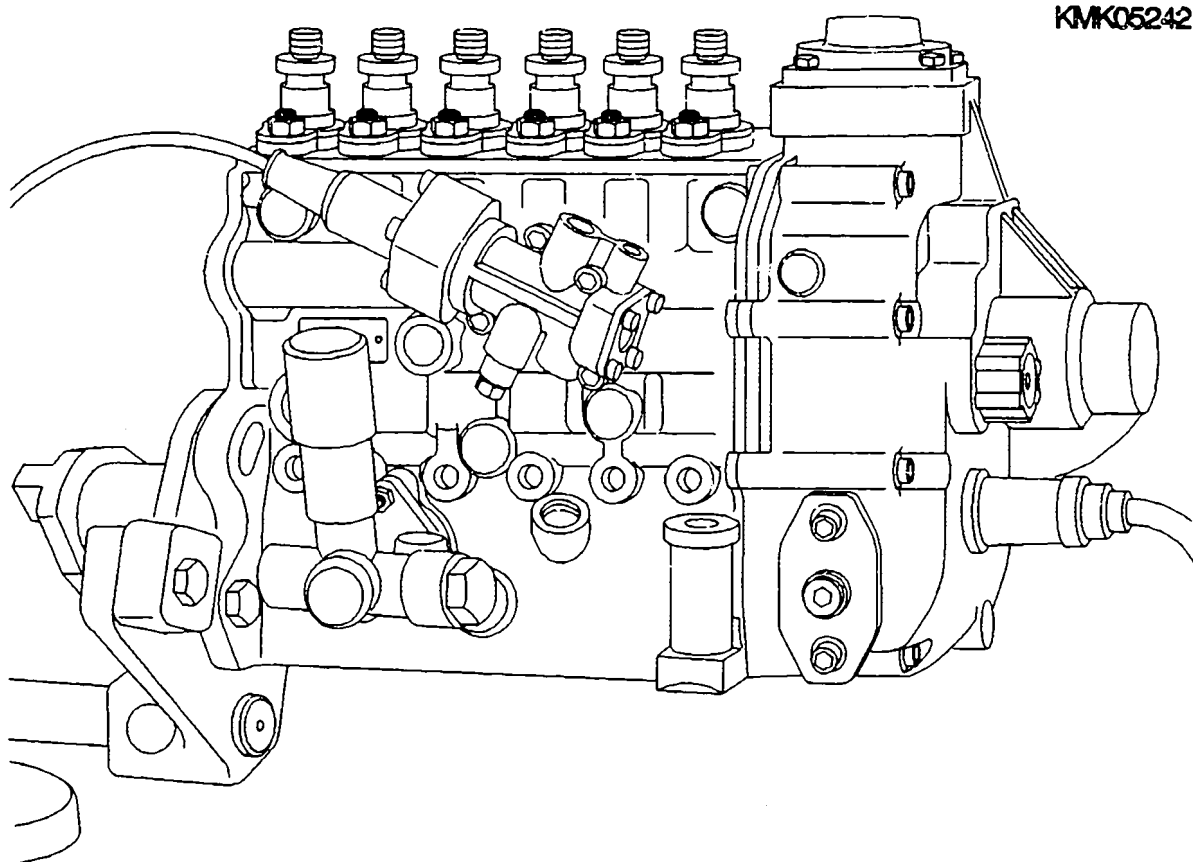
FUEL-INJECTION PUMP DISASSEMBLY

Assemble injection pump complete with RE positioner on swivel-type frame 0 986 611 248 (KDEP 2919). The choice of clamping device is governed by the pump design:

- * Flange mounting: Clamping bracket 0 986 611 358, fastening flange as per pilot.
- * Flat and cradle mounting: Holder 0 986 611 441 in conjunction with clamping device 0 986 612 649.

Fig.: Pump with flange mounting.

Continue: B02/1 Fig.: B01/2



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FUEL-INJECTION PUMP DISASSEMBLY

Mount drive coupling on taper,
drive end:

RP 43 (taper 35 mm):

- Taper length 28 mm: 1 686 430 038

- Taper length 36 mm: 1 686 430 040

(Two-jaw version)

RP 39 (taper 40 mm):

- Taper length 28 mm: 1 685 702 075

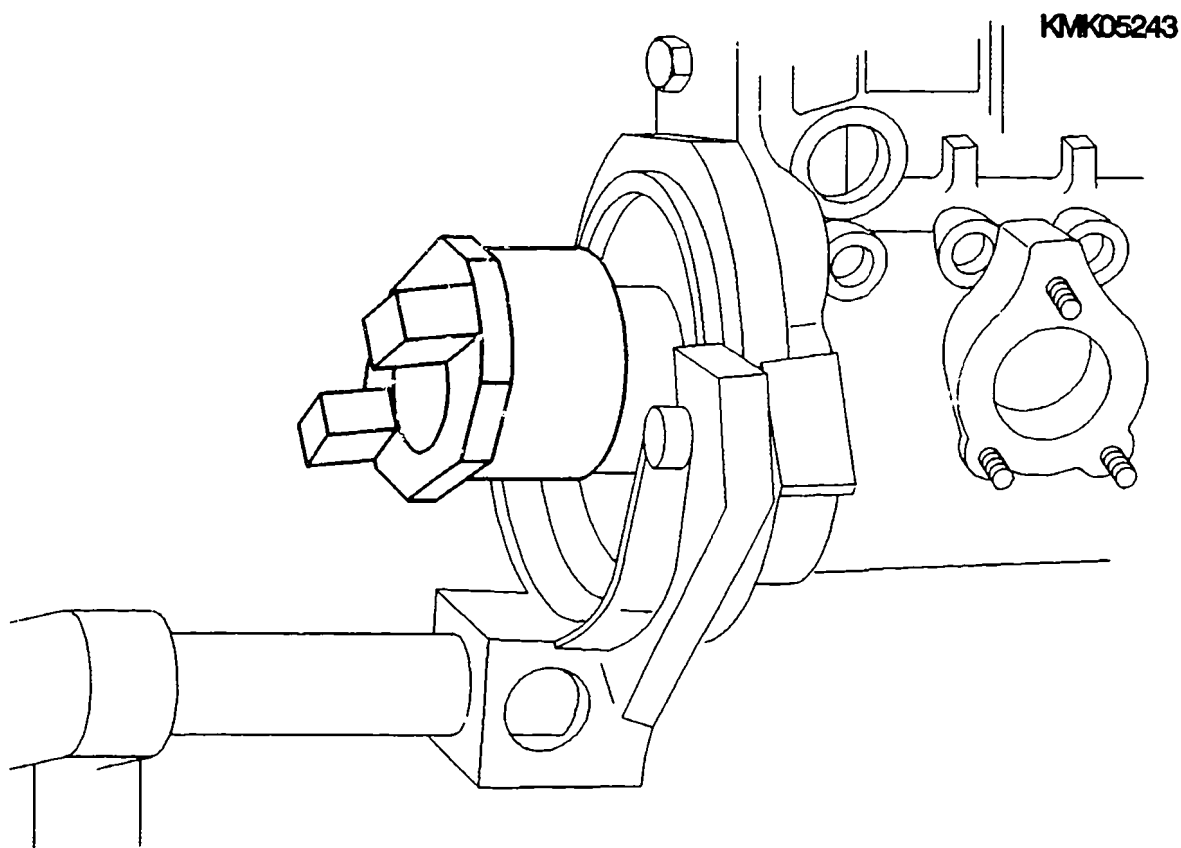
- Taper length 41 mm: 1 685 702 076

(Flange version)

Plus:

- Hook wrench 1 687 950 530

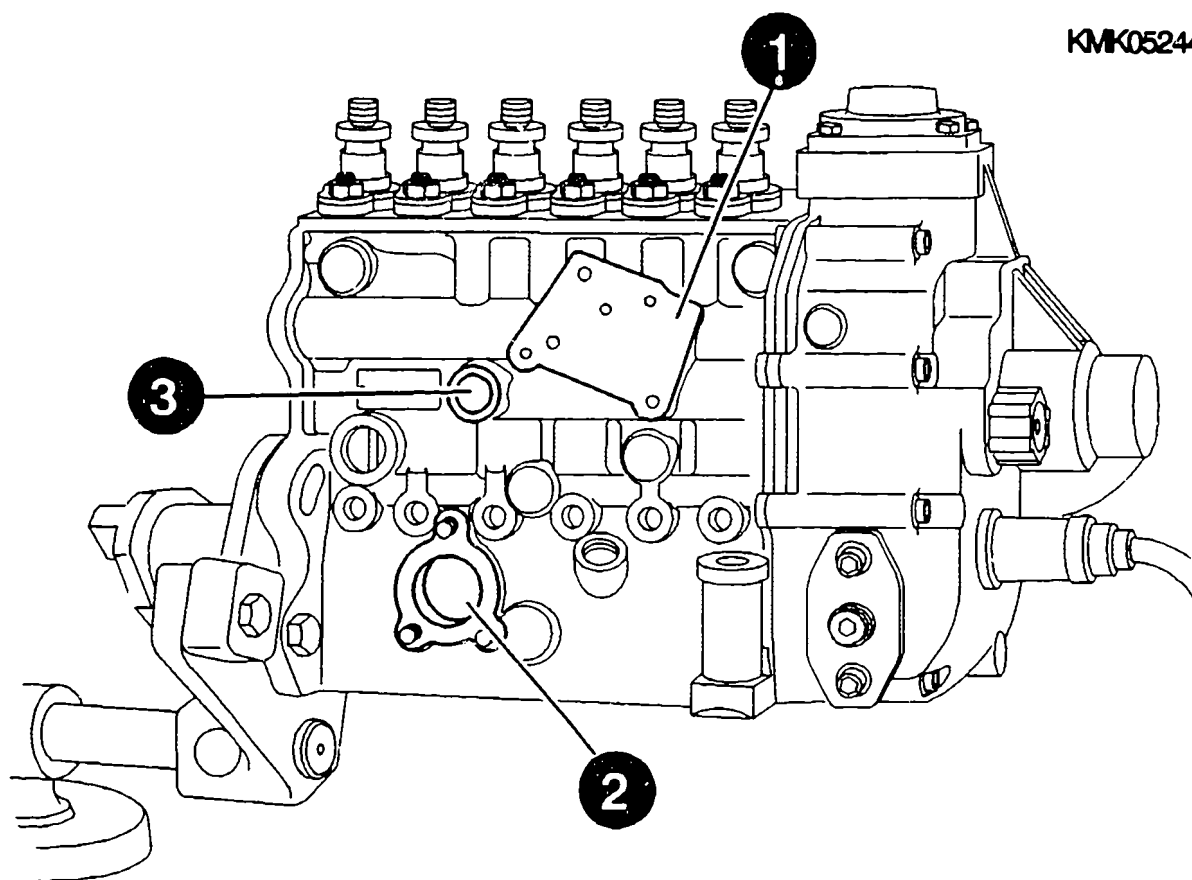
Continue: B03/1 Fig.: B02/2



FUEL-INJECTION PUMP DISASSEMBLY

Unscrew/screw out add-on parts EHAB/
ELAB (1, depending on version), supply
pump (2), fuel-temperature sensor
(3, if fitted) and screw plugs for
start-of-delivery bore/camshaft
chamber.

Continue: B04/1 Fig.: B03/2



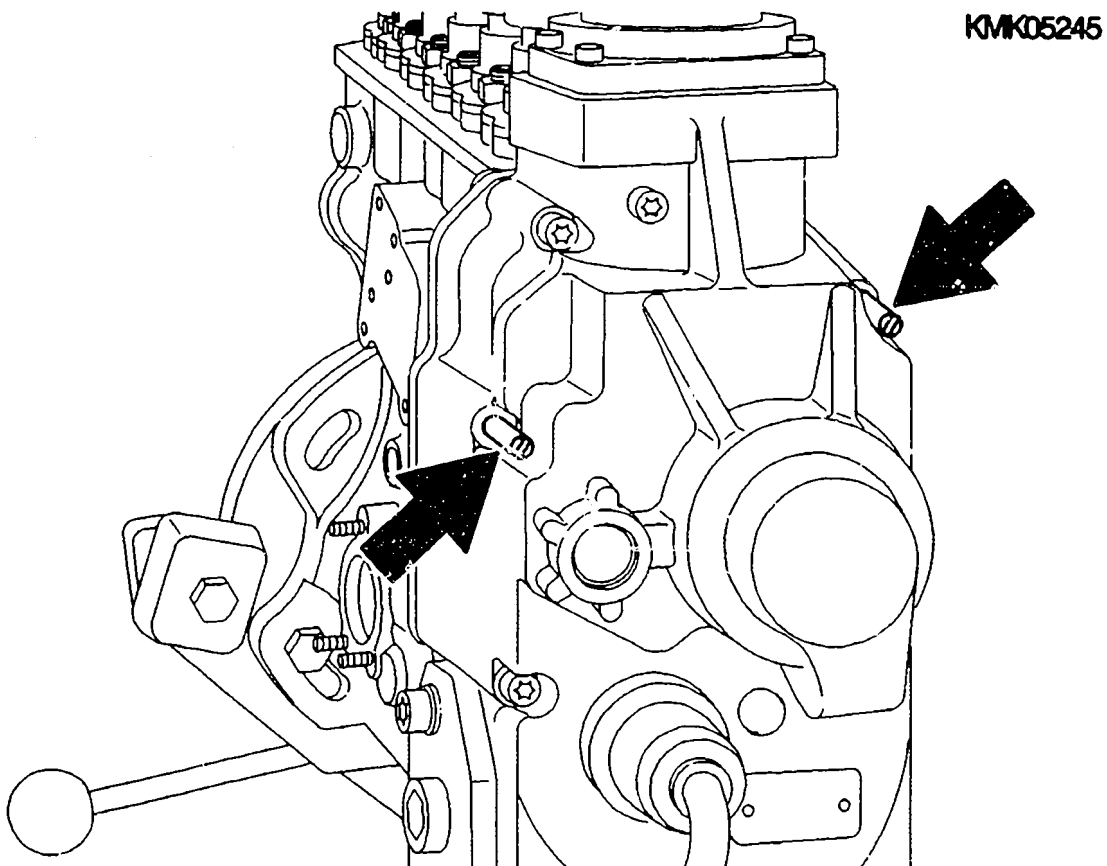
KMK05244

FUEL-INJECTION PUMP DISASSEMBLY

Removing RE positioner from pump housing:

Screw out 2 opposing positioner fastening screws and replace them with the 2 guide pins 0 986 612 598.

Continue: B05/1 Fig.: B04/2



FUEL-INJECTION PUMP DISASSEMBLY

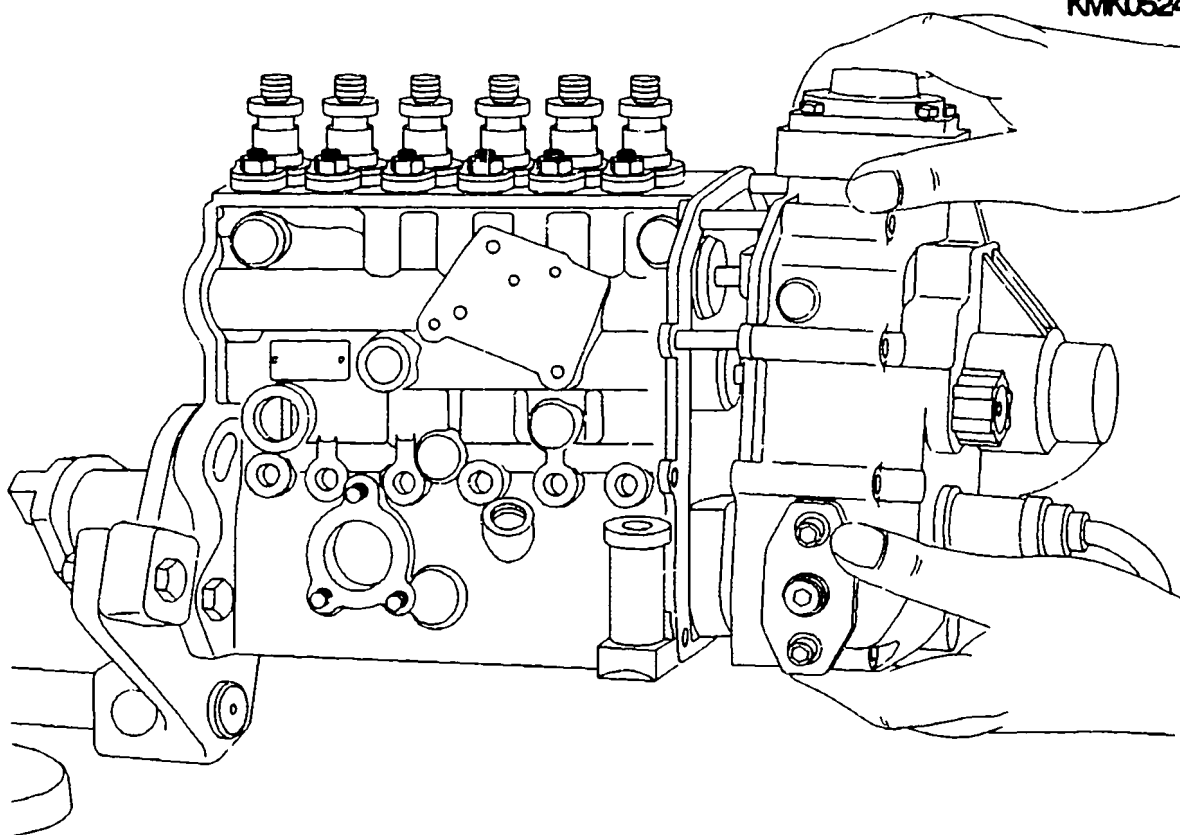
Screw out remaining positioner fastening screws and remove complete positioner via guide pins in axial direction. Catch residual oil.

Proceed with caution so as not to damage short-circuiting ring of RPS and measuring arms or control lever of prestroke shaft.

Note: Refer to separate instructions for repairs to RE positioner.

Continue: B06/1 Fig.: B05/2

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FUEL-INJECTION PUMP DISASSEMBLY

Removing disk cam and viscous oil pump:

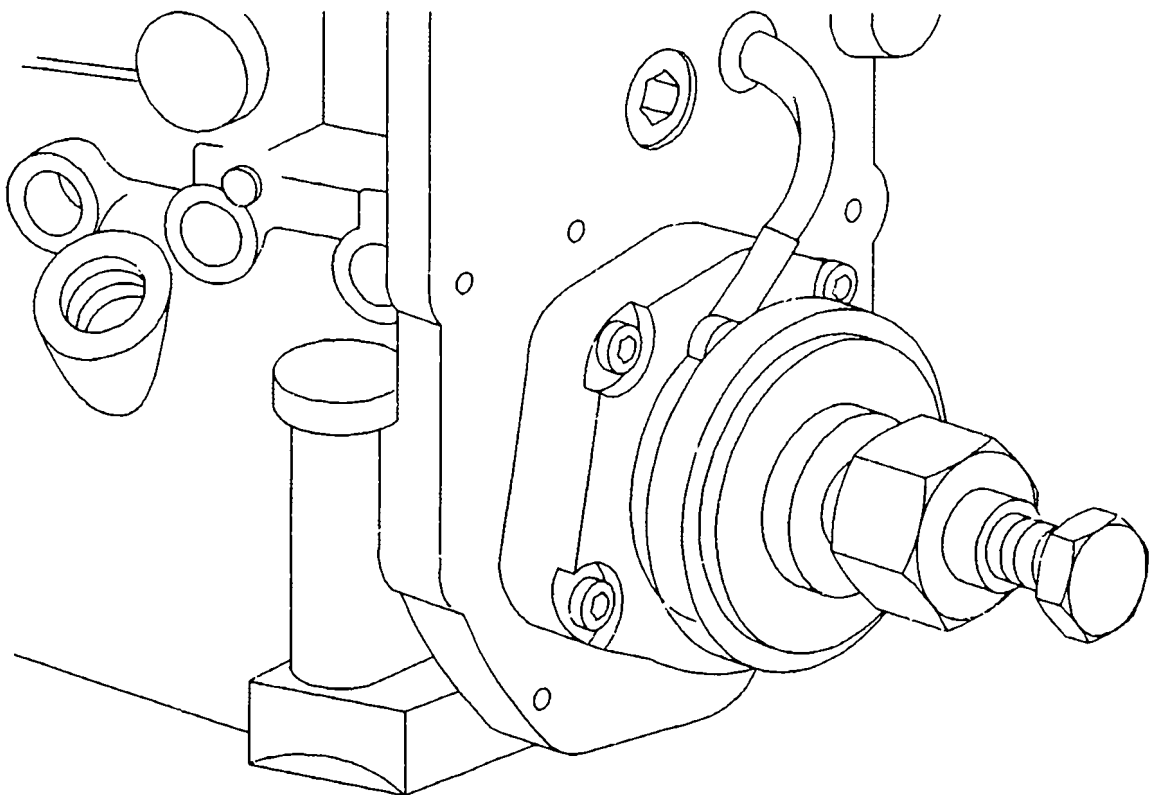
Counter-hold with holding wrench
0 986 611 084 at drive coupling and
unscrew fastening nut of disk cam at
camshaft taper.

Remove disk cam with puller
0 986 618 245 from taper of camshaft.

Pull hose of oil pump off nipple of
pump housing and remove oil pump with
spring from bearing flange.

Continue: B07/1 Fig.: B06/2

KV/K05247

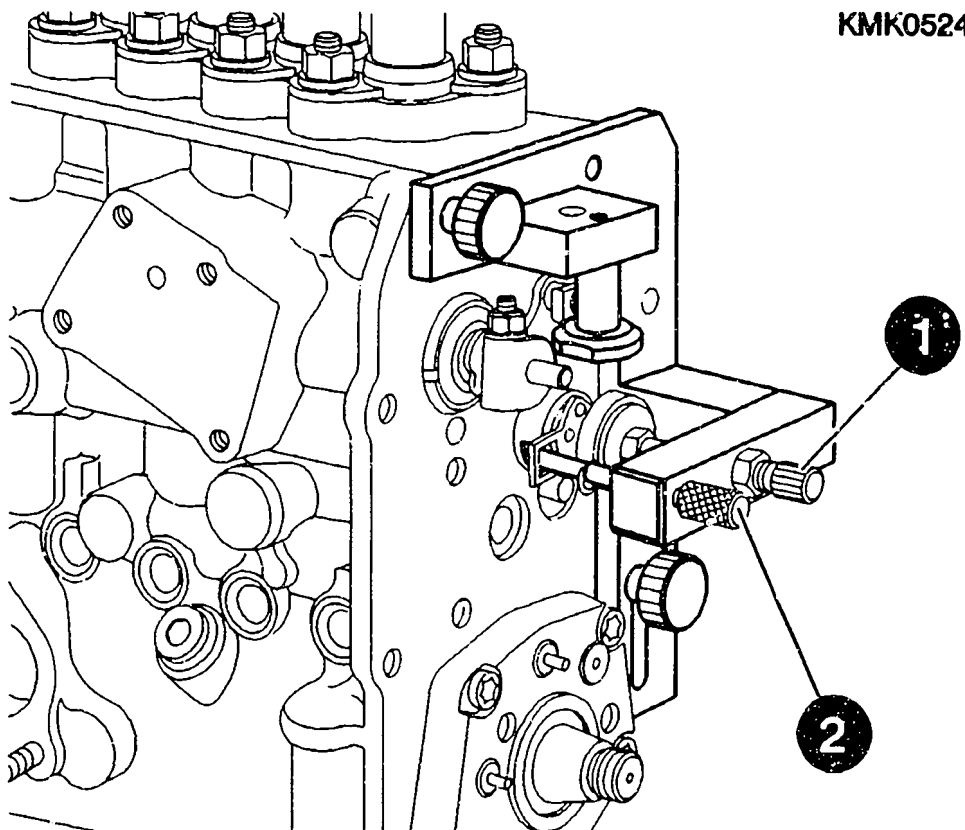


FUEL-INJECTION PUMP DISASSEMBLY

Checking position of RPS short-circuiting ring:

Prior to further disassembly of injection pump, check position of RPS short-circuiting ring at control rod with setting device 0 986 612 620. This is necessary since its position cannot be checked on the subsequently removed control rod (complete unit with bushing, spring, plate washer with ring and cap nut).

Continue: B08/1 Fig.: B07/2



FUEL-INJECTION PUMP DISASSEMBLY

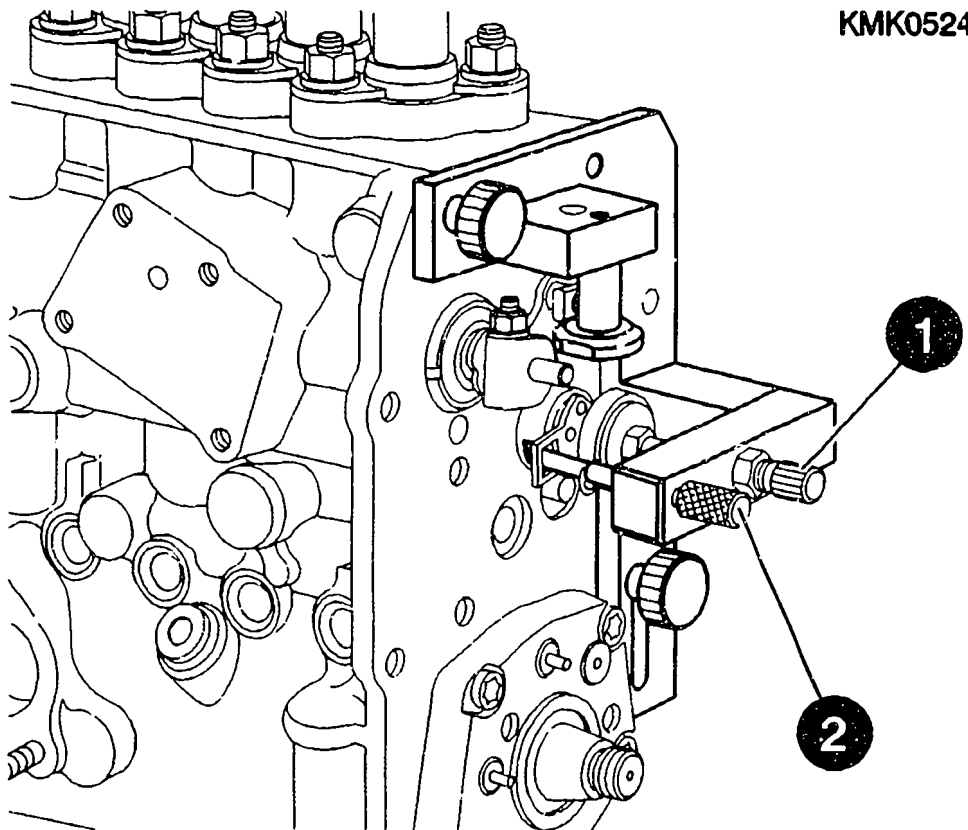
Checking position of RPS short-circuiting ring:

Before attaching setting device, stop bracket for control lever of pre-stroke shaft may have to be removed for space reasons.

Support setting device at positioning pin at top right of pump housing and screw into the appropriate tapped holes in the housing using the two knurled screws.

Set control rod with adjusting screw (1) to roughly (estimate) half travel. Check position of ring with measuring rod (2).

Continue: B09/1 Fig.: B08/2



FUEL-INJECTION PUMP DISASSEMBLY

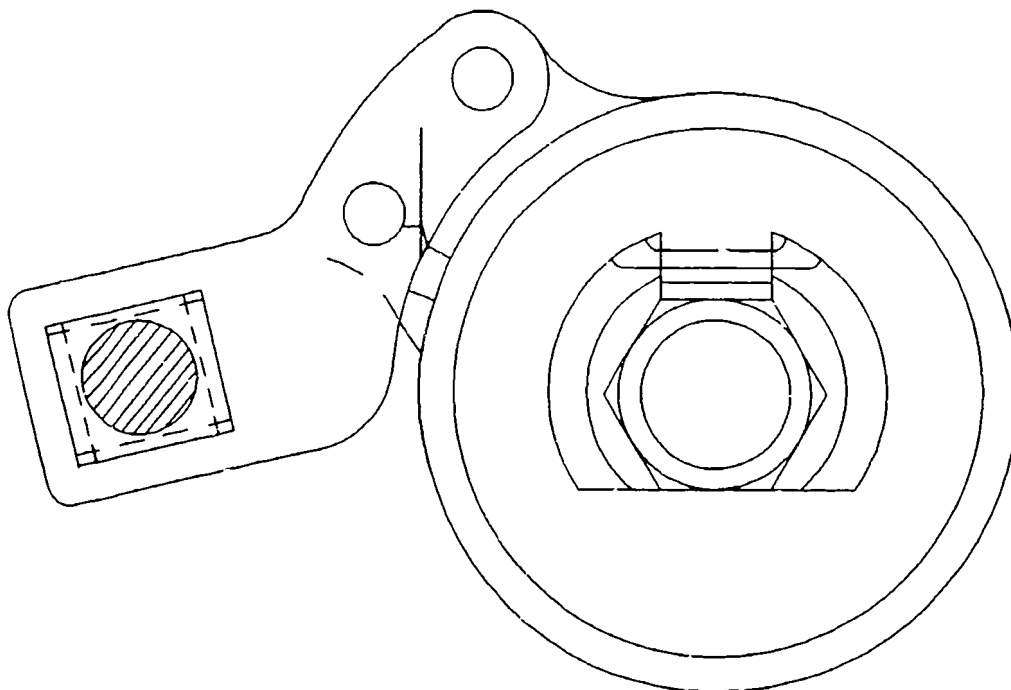
Checking position of RPS short-circuiting ring:

It must be possible to insert the measuring rod without resistance even if the control rod is turned and released again.

If the position of the ring does not correspond to that of the setting device, the control rod (complete unit) is to be replaced or scrapped on pump repair.

Continue: B10/1 Fig.: B09/2

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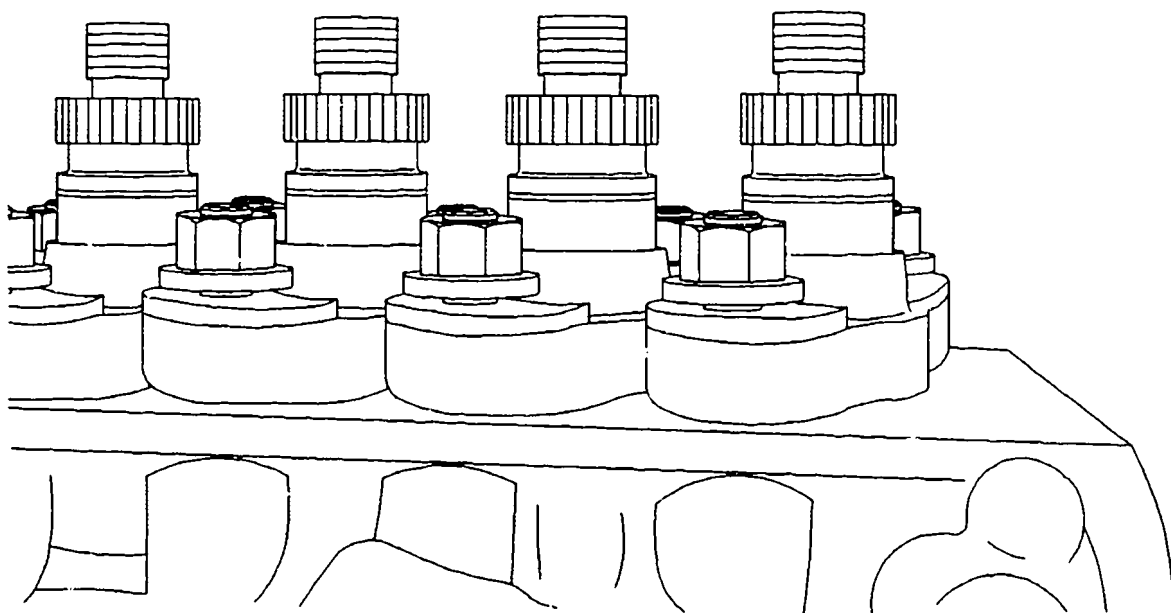


FUEL-INJECTION PUMP DISASSEMBLY

Prior to further disassembly, loosen all fastening nuts of barrel-and-valve assembly flanges on top of pump and turn back approx. 1 mm.

Continue: B11/1 Fig.: B10/2

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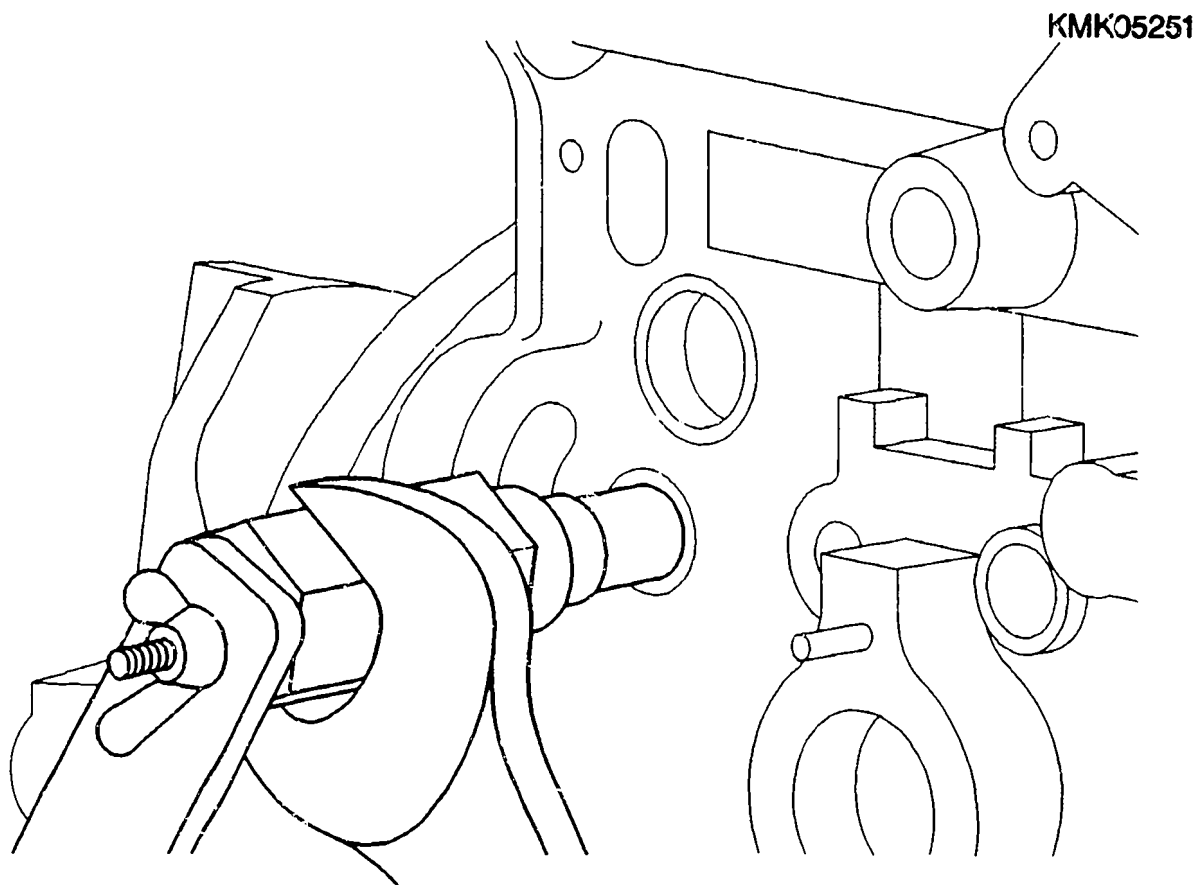
FUEL-INJECTION PUMP DISASSEMBLY

Removing closure caps of roller-tappet retention holes:

Use extractor 0 986 611 668 and support sleeve 0 986 611 676

Insert support sleeve into threaded sleeve of tool. Turn back threaded sleeve as far as it will go and insert collet chuck of tool into closure cap as far as stop. Secure wing nut to stop collet chuck straddling in closure cap.

Continue: B12/1 Fig.: B11/2



FUEL-INJECTION PUMP DISASSEMBLY

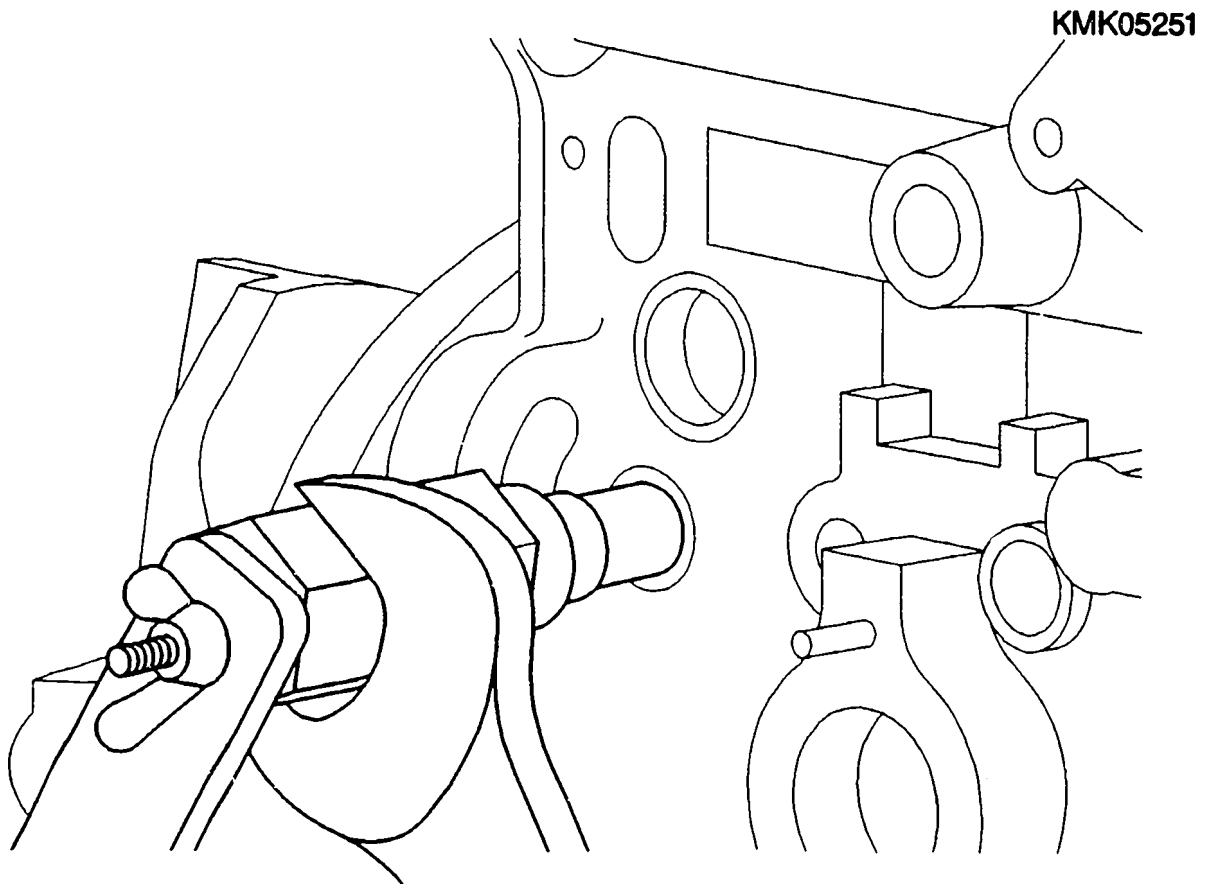
Removing closure caps of roller-tappet retention holes:

Hold lever of tool and turn threaded sleeve clockwise with wrench until cap is released from pump housing.

Remove closure cap by loosening wing nut of collet chuck.
Repeat process with all barrels.

Note: Scrap closure caps after removal. They are not to be re-used.

Continue: B13/1 Fig.: B12/2



FUEL-INJECTION PUMP DISASSEMBLY

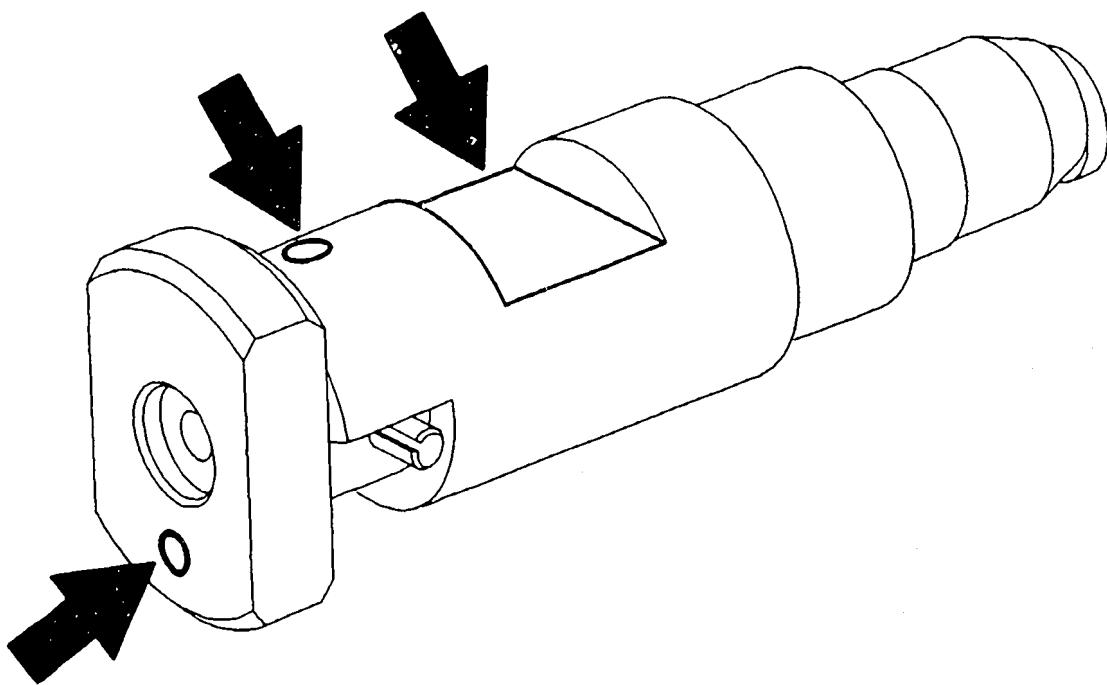
Tappet-holder assembly:

Position holding wrench 0 986 611 084 at drive coupling. Turn camshaft such that one roller tappet is in TDC position. This frees the tappet retention hole for insertion of the tappet holder 0 986 612 482.

Insert tappet holder in retention hole such that the milled surface is exactly horizontal at the top and such that the "0" on the eccentric shaft is at the bottom. Tappet holder must be pressed into housing as far as it will go.

Continue: B14/1 Fig.: B13/2

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FUEL-INJECTION PUMP DISASSEMBLY

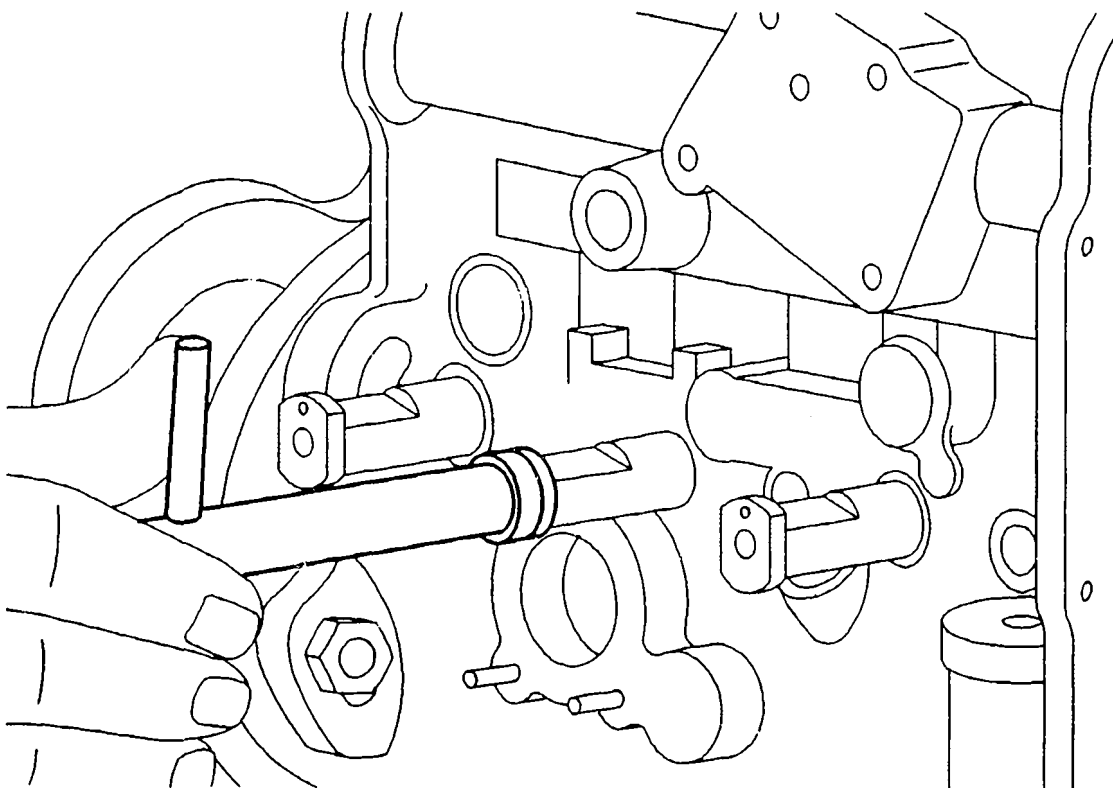
Tappet-holder assembly:

Hold sleeve of tappet holder and use socket wrench 0 986 612 489 to turn eccentric shaft through 180 degrees. The end-face "0" is now at the top. The roller tappet is thus lifted off the cam of the camshaft.

The described procedure for inserting the tappet holder and freeing the roller tappet is to be repeated on all pump barrels.

Continue: B15/1 Fig.: B14/2

KMK05253



FUEL-INJECTION PUMP DISASSEMBLY

Drive-coupling disassembly:

Counter-hold drive coupling with holding wrench 0 986 611 084 or 1 687 950 530 and pull off by turning fastening nut counter-clockwise.
Remove wedge.

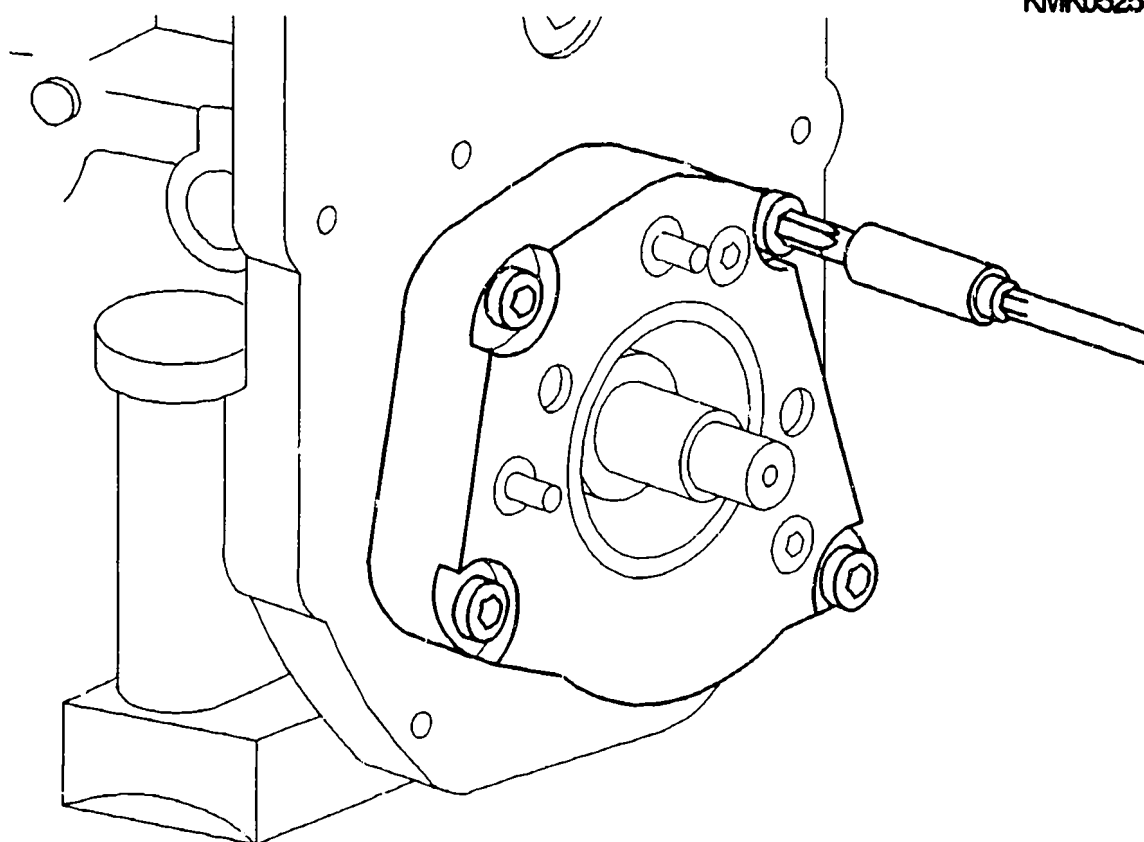
Continue: B16/1

FUEL-INJECTION PUMP DISASSEMBLY

Camshaft removal:

Screw out fastening screws of governor-end shield and remove shield with seal ring.

Continue: B17/1 Fig.: B16/2



KMK05254

FUEL-INJECTION PUMP DISASSEMBLY

Camshaft removal:

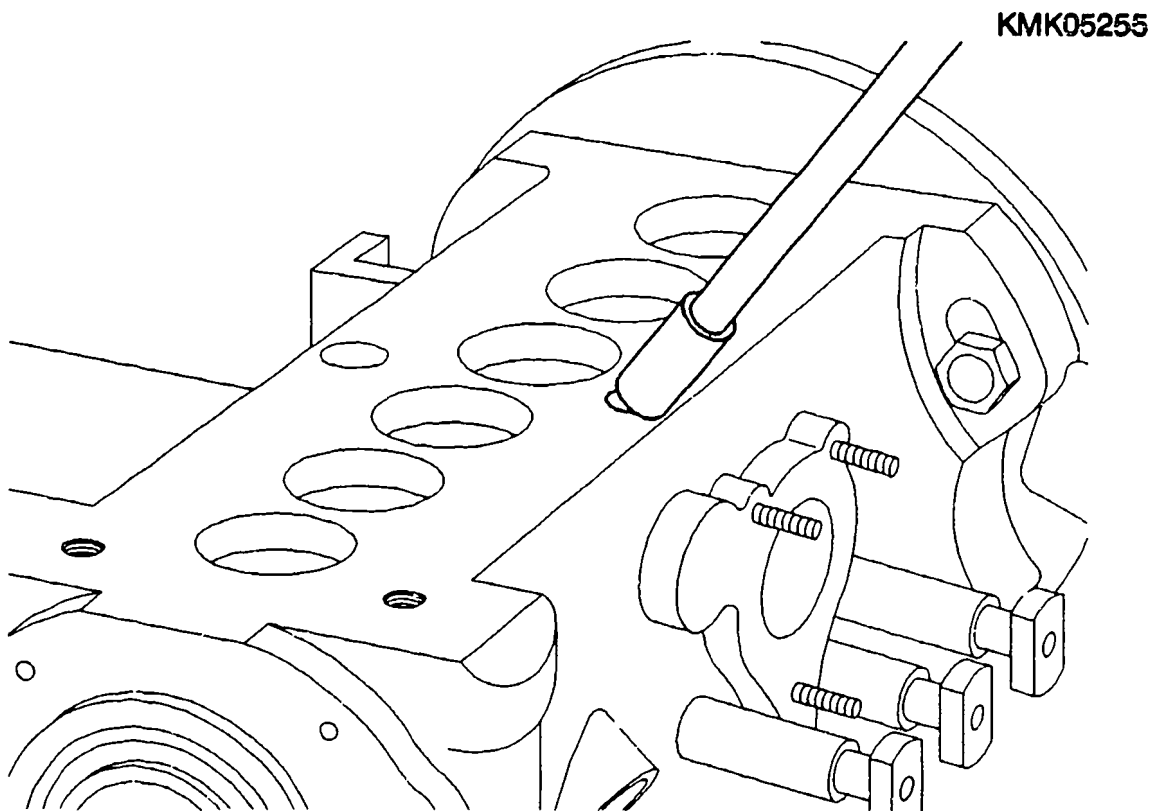
Swivel injection pump downwards
(base at top).

Loosen fastening screws of camshaft
intermediate bearing and screw them
out. Remove resilient sleeves.

Note:

Fastening screws and resilient
sleeves are to be scrapped and
replaced with new ones.

Continue: B18/1 Fig.: B17/2



FUEL-INJECTION PUMP DISASSEMBLY

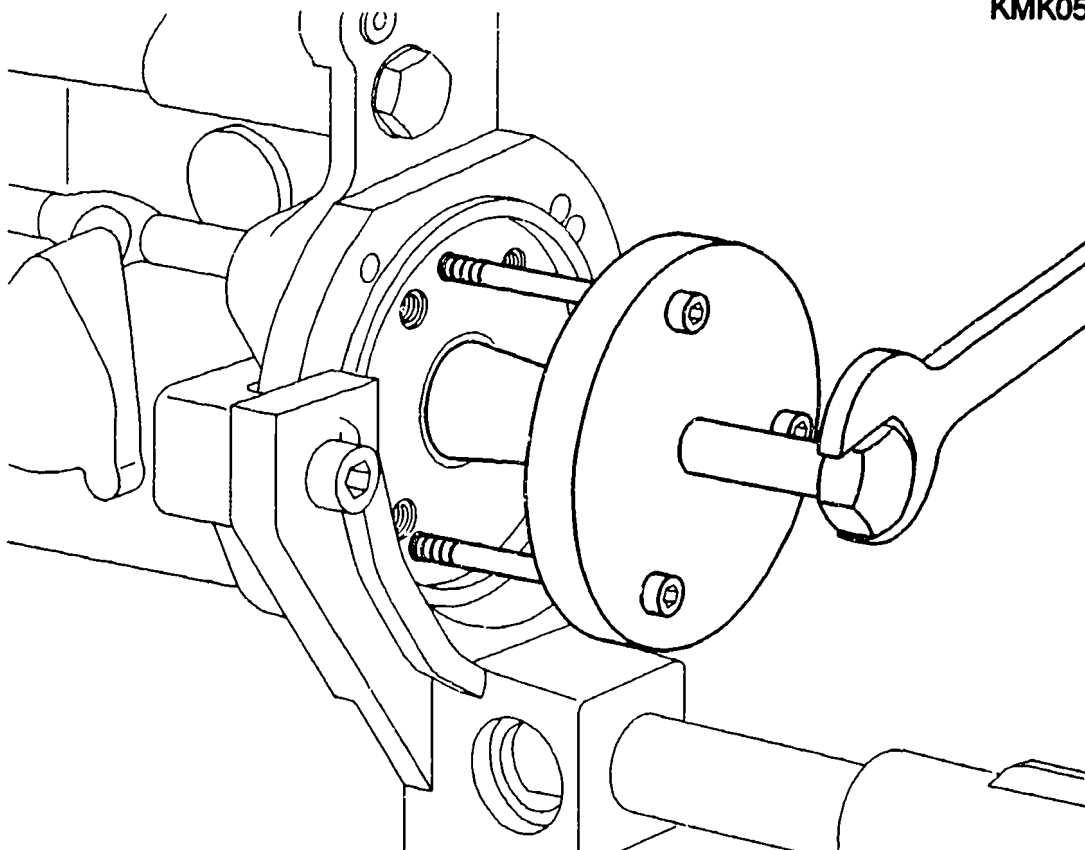
Camshaft removal

Screw out fastening screws of drive-end shield.

Screw extractor 0 986 612 505 with three bolts (M 6) to end shield. Turn pressing-off screw of tool against camshaft taper until shield can be removed from pump housing.

Continue: B19/1 Fig.: B18/2

KMK05256



FUEL-INJECTION PUMP DISASSEMBLY

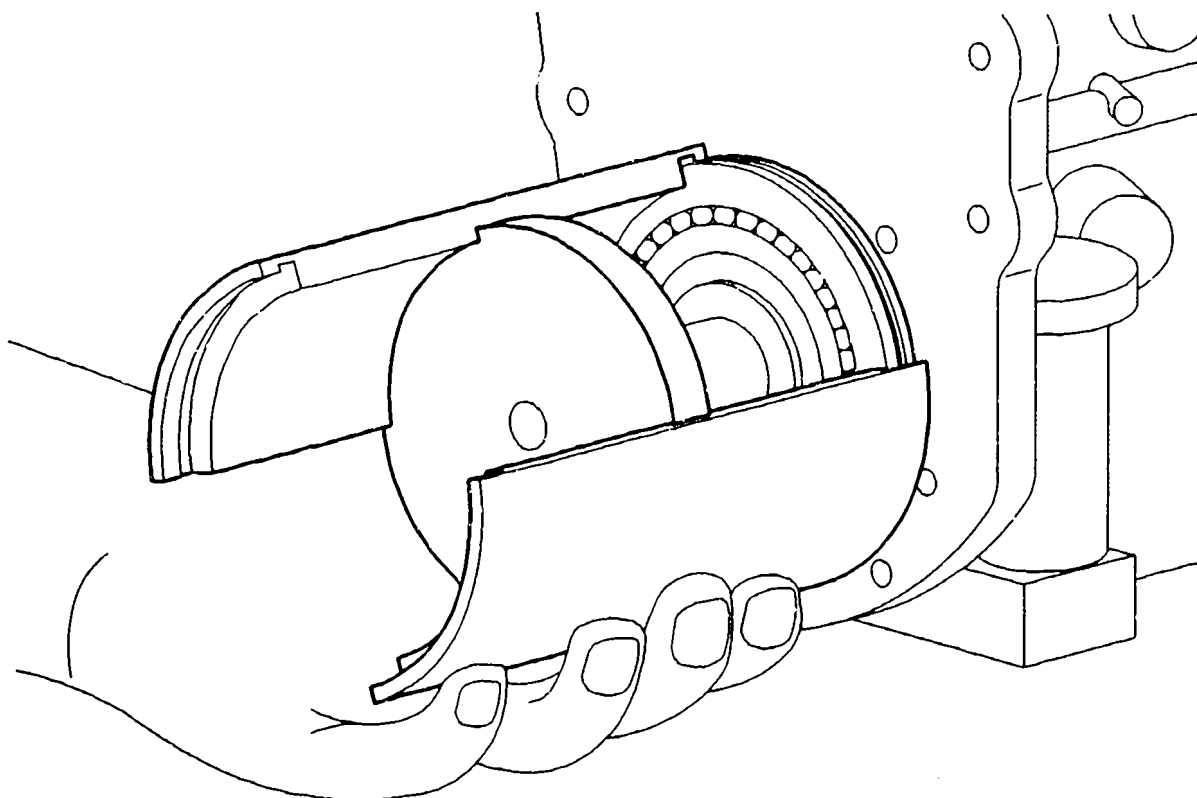
Camshaft removal (applies only to self-aligning roller bearing on governor end):

Remove self-aligning roller bearing (complete with camshaft) using extractor 0 986 612 630. Two-piece spring collet has two applications: small diameter for bearing diameter 75 mm, large diameter for bearing diameter 82 mm.

Position two-piece spring collet with appropriate diameter at annular groove of self-aligning roller bearing and hold with one hand.

Continue: B20/1 Fig.: B19/2

KMK05257



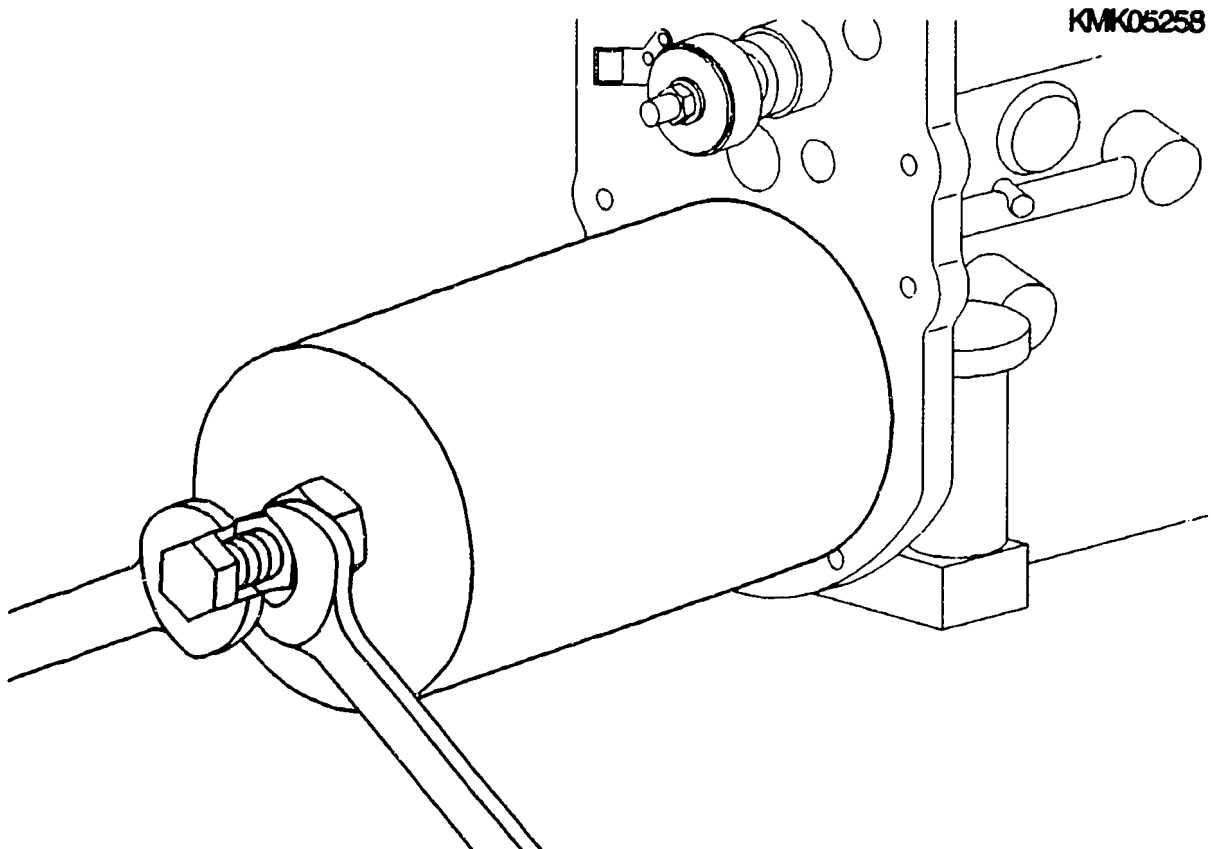
FUEL-INJECTION PUMP DISASSEMBLY

Camshaft removal (applies only to self-aligning roller bearing on governor end):

Slip puller bell over two-piece spring collet until it makes contact with pump housing. Insert puller screw and screw approx. 15 mm into intermediate plate of spring collet.

Counter-hold at puller screw and pull bearing together with camshaft out of housing by screwing in lock nut.

Continue: B21/1 Fig.: B20/2



FUEL-INJECTION PUMP DISASSEMBLY

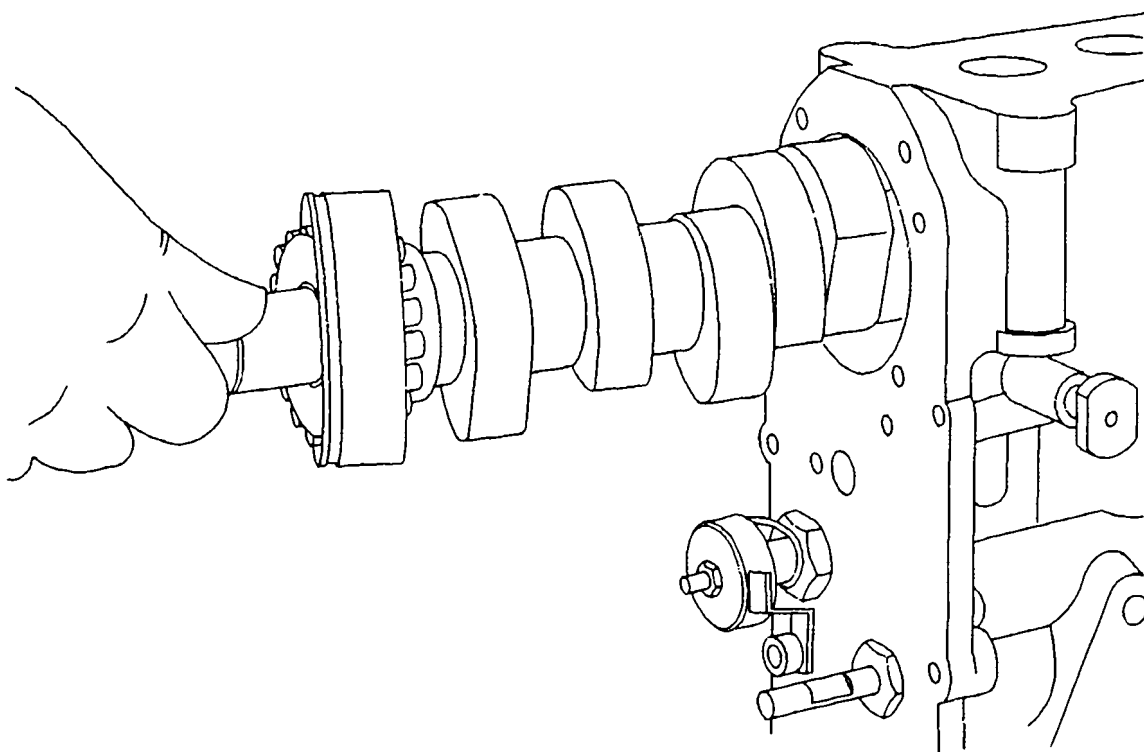
Camshaft removal (applies only to self-aligning roller bearing on governor end):

Remove extractor from self-aligning roller bearing and carefully remove camshaft with bearing and intermediate bearing from pump housing. Remove and set down intermediate bearing.

If self-aligning roller bearing has to be replaced, see Section: "Component checking and repair", as of Coordinate: D02/1

Continue: B22/1 Fig.: B21/2

KMK05250



FUEL-INJECTION PUMP DISASSEMBLY

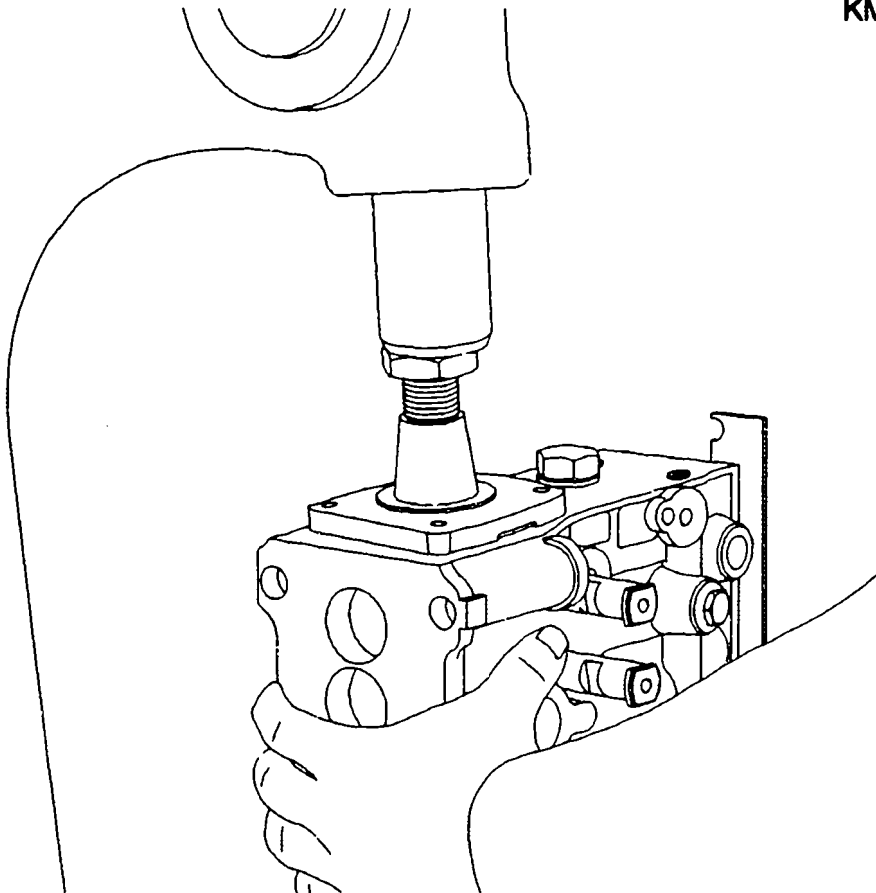
Camshaft removal (cylindrical roller bearing on governor end): removal again includes bearing.

Remove pump from assembly frame and position governor end on press such that bearing outer race is free. Screw coupling fastening nut onto camshaft thread leaving two turns visible. Press camshaft with bearing out of housing from drive end and remove carefully together with intermediate bearing.

Attention: Do not pull off bearing outer race as rollers will drop out. If this happens, stick rollers in with grease and slip on bearing ring.

Continue: B23/1 Fig.: B22/2

KMK05208



FUEL-INJECTION PUMP DISASSEMBLY

Disassembling control lever of prestroke shaft:

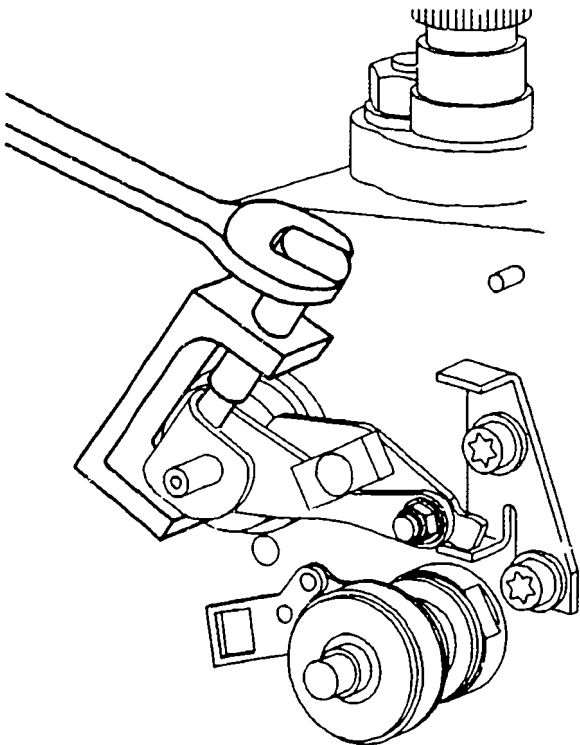
Screw off self-locking nut of wedge screw and remove washer.

Loosen wedge screw with disassembly tool 0 986 612 640 as shown in fig. (right).

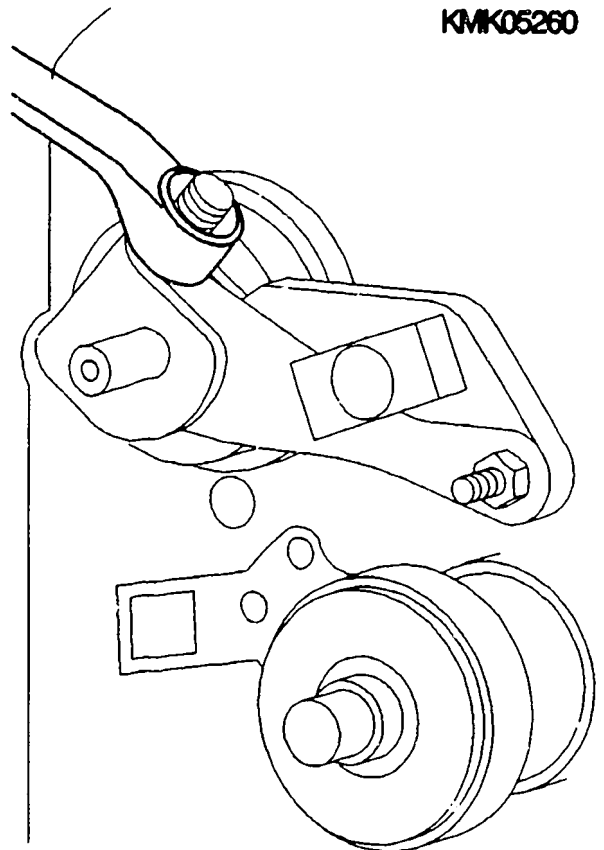
Pull control lever off spigot of prestroke shaft.

Continue: B24/1 Fig.: B23/2

KMK05261



KMK05260



FUEL-INJECTION PUMP DISASSEMBLY

Removing prestroke shaft:

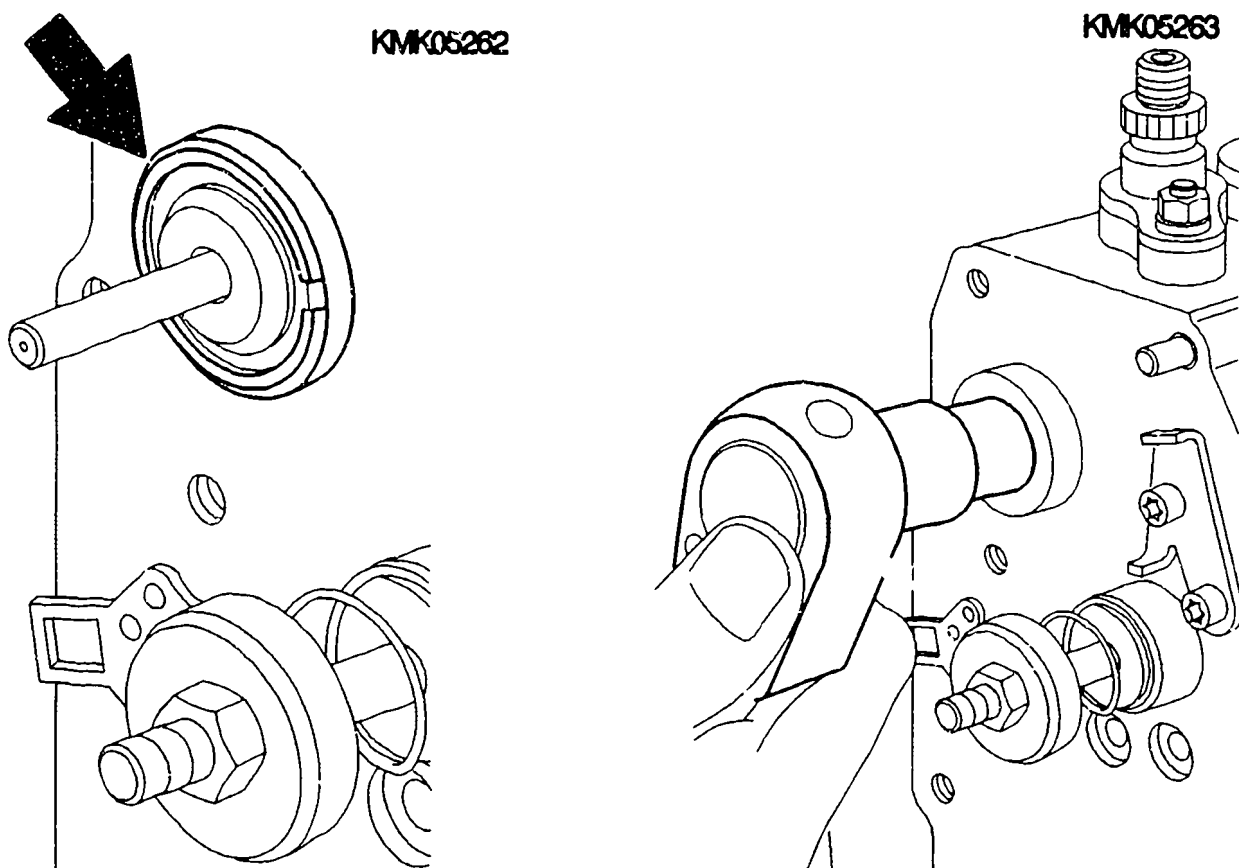
Injection pump vertical.

Governor-end bearing of prestroke shaft is held by a threaded ring (arrow).

Screw out threaded ring with assembly wrench (pin-type socket wrench) 0 986 612 643 and suitable ordinary wrench.

Note: Press assembly wrench firmly against threaded sleeve. Thread is microencapsulated and thus difficult to release. If necessary, warm with hot-air blower in area around threaded ring.

Continue: B25/1 Fig.: B24/2



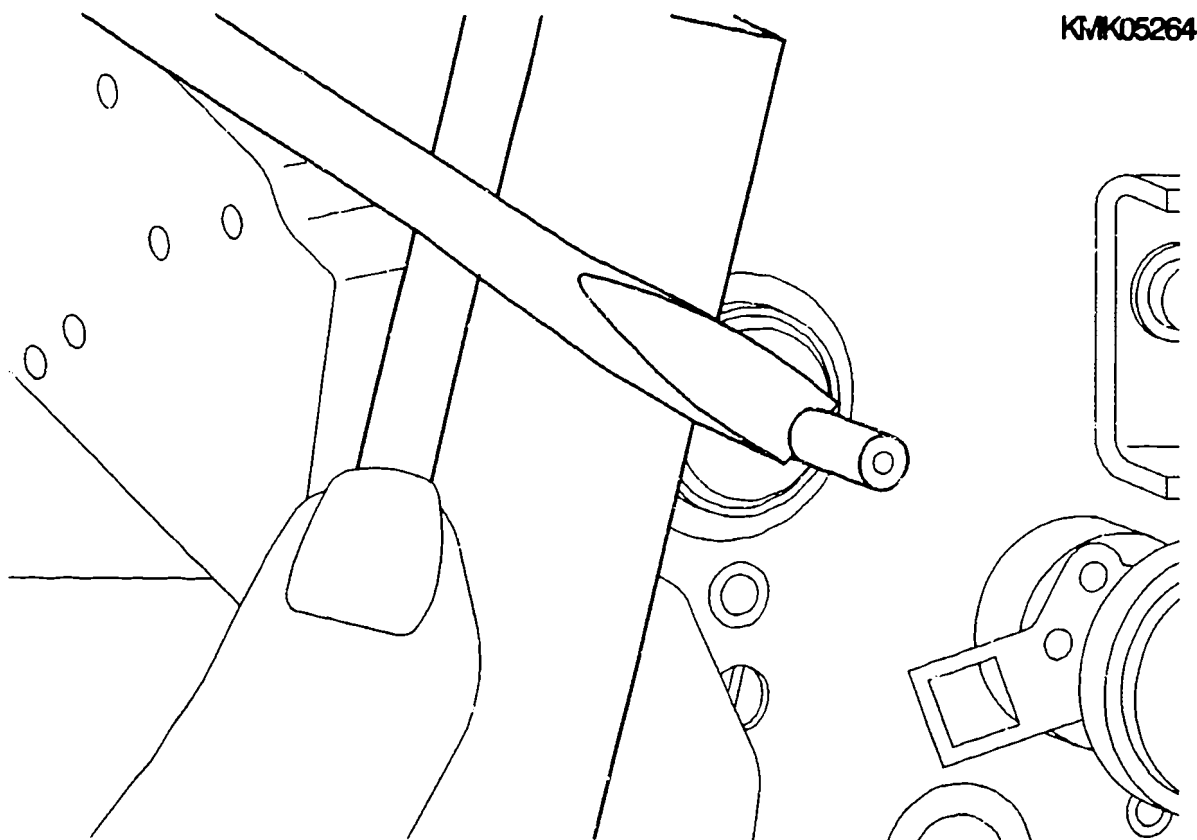
FUEL-INJECTION PUMP DISASSEMBLY

Removing prestroke shaft:

Pull prestroke shaft complete with governor-end bearing out of pump housing. If the bearing is somewhat difficult to release on account of the O-ring, it may be necessary to loosen it using a screwdriver and an appropriate means of support.

Always pay attention to note on next Coordinate.

Continue: B26/1 Fig.: B25/2



FUEL-INJECTION PUMP DISASSEMBLY

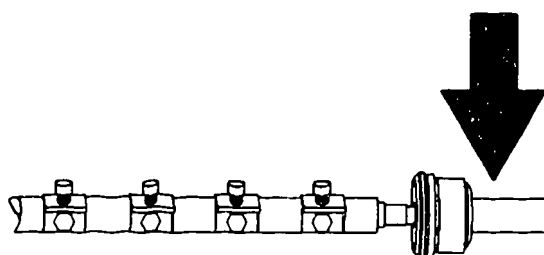
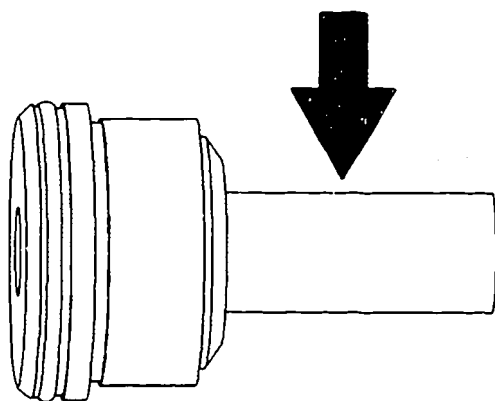
Removing prestroke shaft:

Note: Bearing is only to be removed complete with prestroke shaft. Do not pull bearing off shaft. The bearing contains a seal ring with a sensitive sealing lip (suction gallery seal). So as not to damage this seal ring, the assembly sleeve 0 986 612 639 is always to be inserted (arrows) into the bearing as far as it will go when disassembling and assembling the bearing. In cases of doubt and after lengthy pump service bearing is always to be renewed.

Continue: B27/1 Fig.: B26/2

KMK05265

KMK05266



FUEL-INJECTION PUMP DISASSEMBLY

Removing drive-end prestroke shaft bearing:

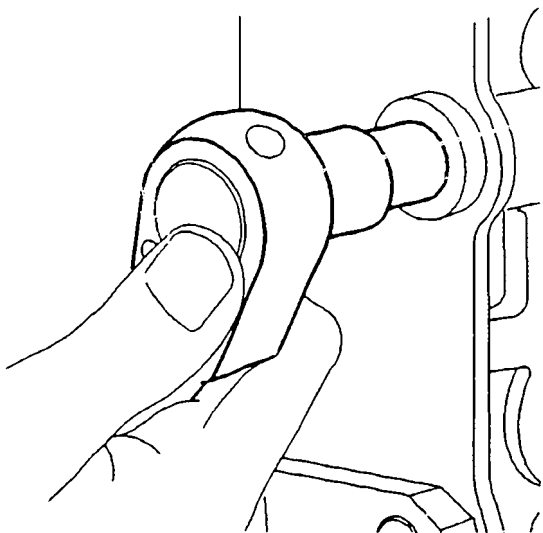
Screw out threaded ring with assembly wrench 0 986 612 643. Press firmly against assembly wrench.

If necessary, warm microencapsulated threaded ring (same design as on governor end) with hot-air blower.

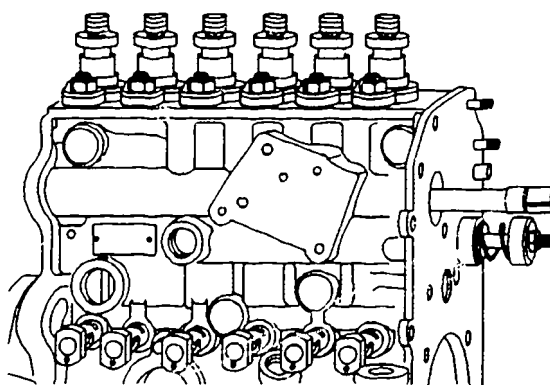
Press out bearing from governor end with mandrel of appropriate length (min. 12 mm thick).

Continue: B28/1 Fig.: B27/2

KMK05267



KMK05268

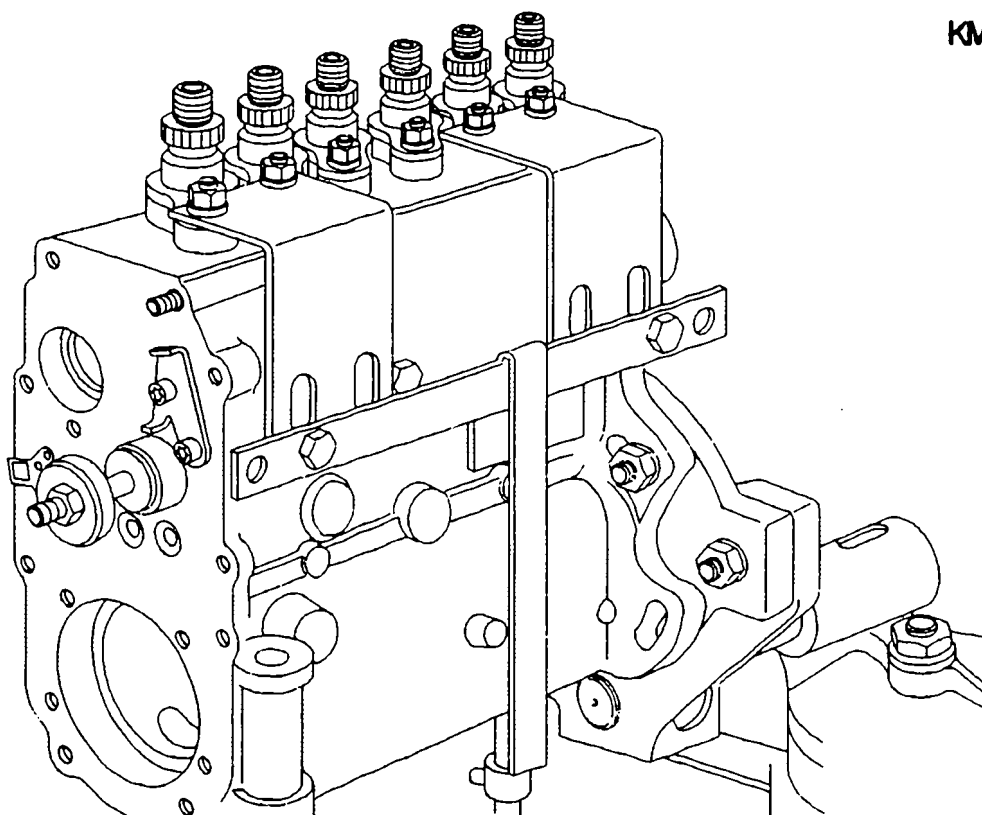


FUEL-INJECTION PUMP DISASSEMBLY

Roller-tappet removal:

Unscrew rear fastening nuts (back of pump = control-rod side) of the two outer barrel-and-valve assemblies in each case and use them to screw on the angle holders 0 986 612 636. Only tighten nuts slightly. Screw assembly device 0 986 612 072 to angle holders as shown.

Continue: C01/1 Fig.: B28/2



KMK05269

FUEL-INJECTION PUMP DISASSEMBLY

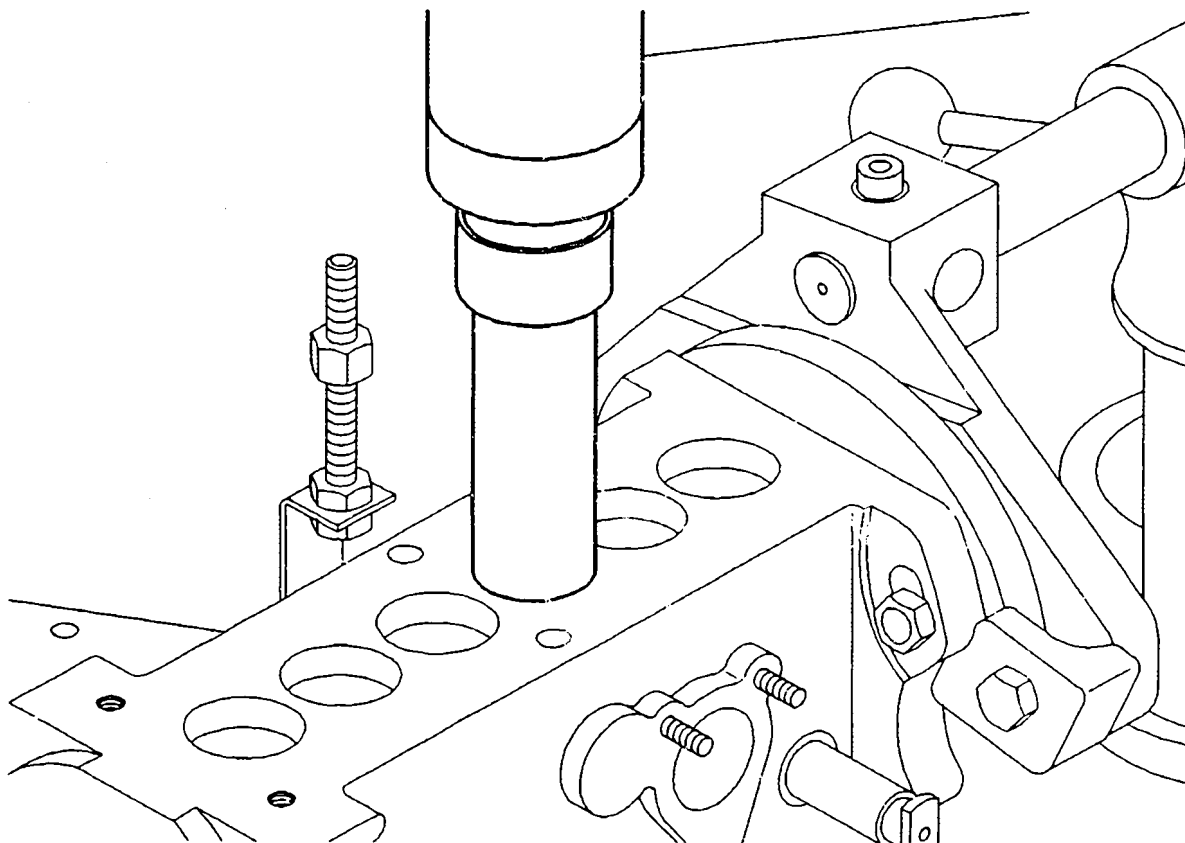
Roller-tappet removal:

Swivel pump downwards (base at top).
Push bottom closure caps inwards
into camshaft chamber using pressing-
in mandrel 0 986 612 119 and remove.

Note: This deforms the closure caps
and they are to be scrapped.
Re-use is not permitted.

Continue: C02/1 Fig.: C01/2

KMK05270



FUEL-INJECTION PUMP DISASSEMBLY

Roller-tappet removal:

Safety precaution:

The procedure outlined in the Section "ROLLER-TAPPET REMOVAL" must be performed with extreme care to avoid the possibility of sudden plunger spring relaxation and INJURY.

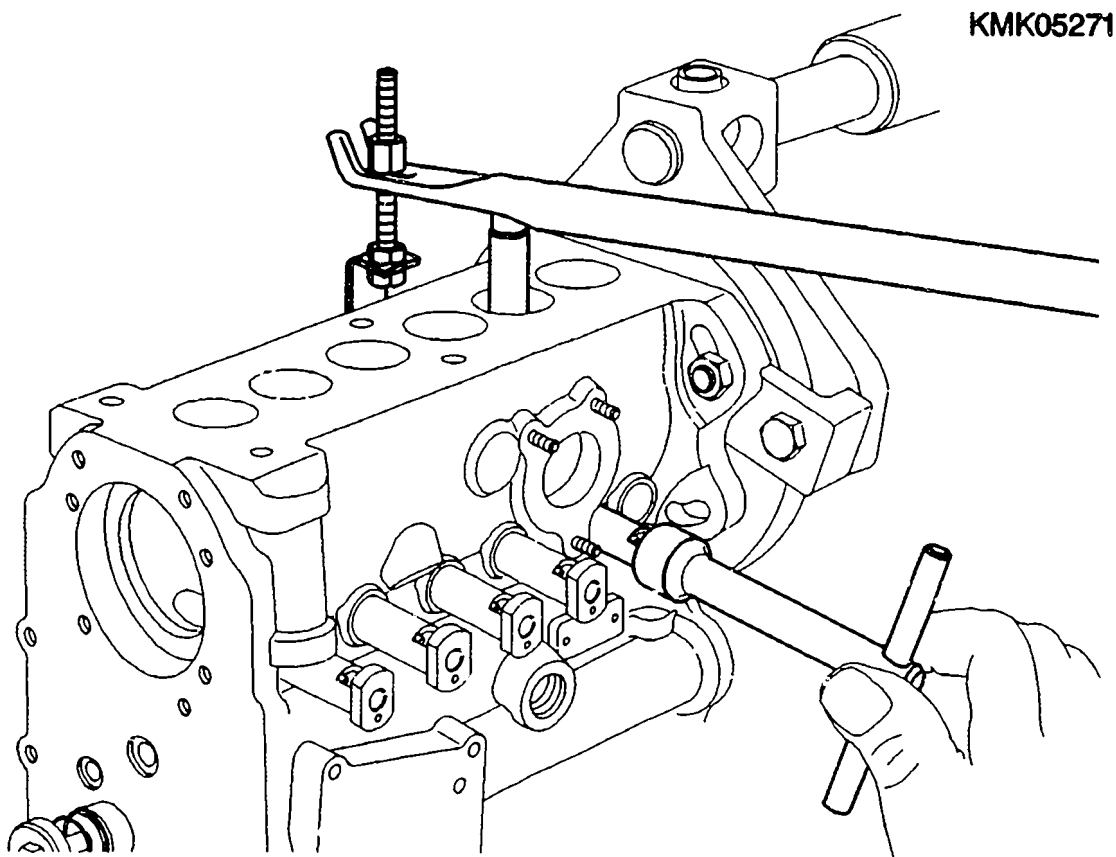
Continue: C03/1

FUEL-INJECTION PUMP DISASSEMBLY

Roller-tappet removal:

Position thrust pin of assembly device 0 986 612 072 on roller-tappet roller. Place hand lever 0 986 611 993 with holes at bottom in assembly device and attach to thrust pin employing one of the holes. Press down and hold lever. At the same time turn eccentric shaft of tappet holder with socket wrench 0 986 612 489 counter-clockwise by 180 degrees to relieve tappet holder.

Continue: C04/1 Fig.: C03/2



FUEL-INJECTION PUMP DISASSEMBLY

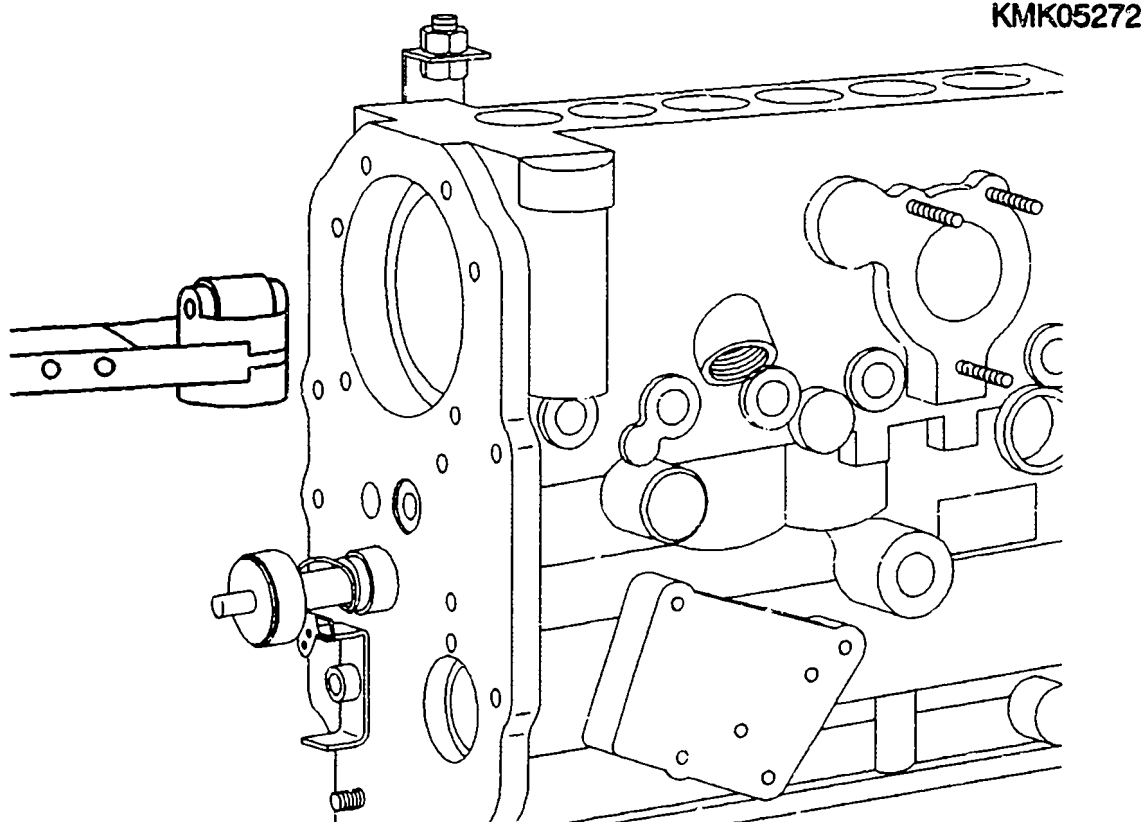
Roller-tappet removal:

Remove tappet holder relieved from retention hole. Move hand lever carefully upwards and thus relax plunger spring.

Remove roller tappet with tappet forceps 0 986 611 298 through camshaft chamber.

Repeat removal procedure on all pump roller tappets and place tappets in order of removal in appropriate compartment.

Continue: C05/1 Fig.: C04/2



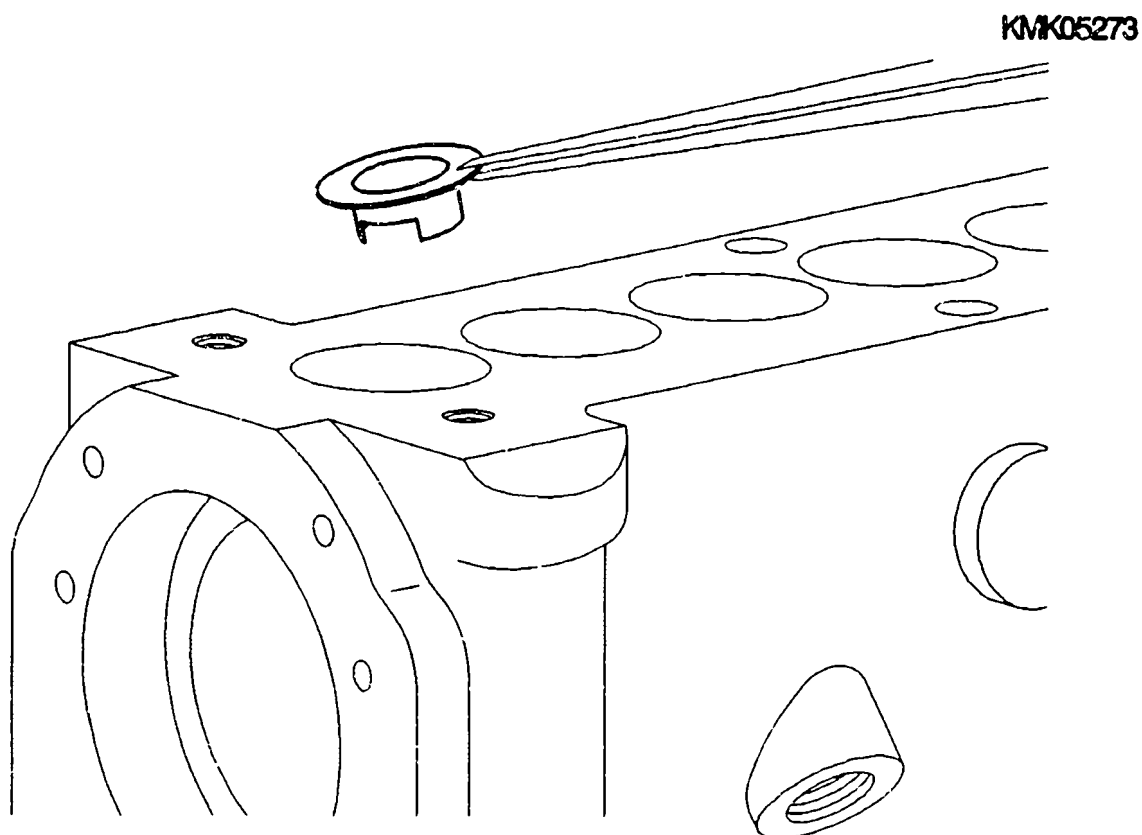
FUEL-INJECTION PUMP DISASSEMBLY

Removing lower spring seats:

Remove assembly device with angle holder.

Disengage all lower spring seats at assembly plungers and remove them.

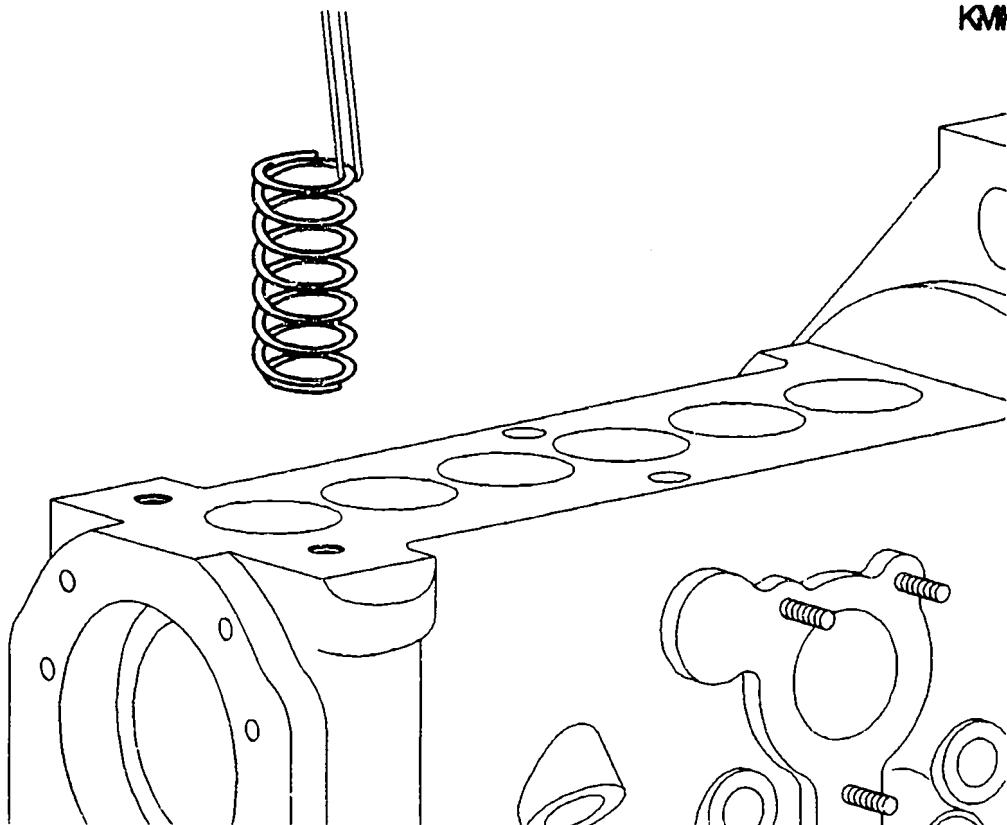
Continue: C06/1 Fig.: C05/2



FUEL-INJECTION PUMP DISASSEMBLY

Use tweezers to remove plunger springs of all barrels.

Continue: C07/1 Fig.: C06/2



FUEL-INJECTION PUMP DISASSEMBLY

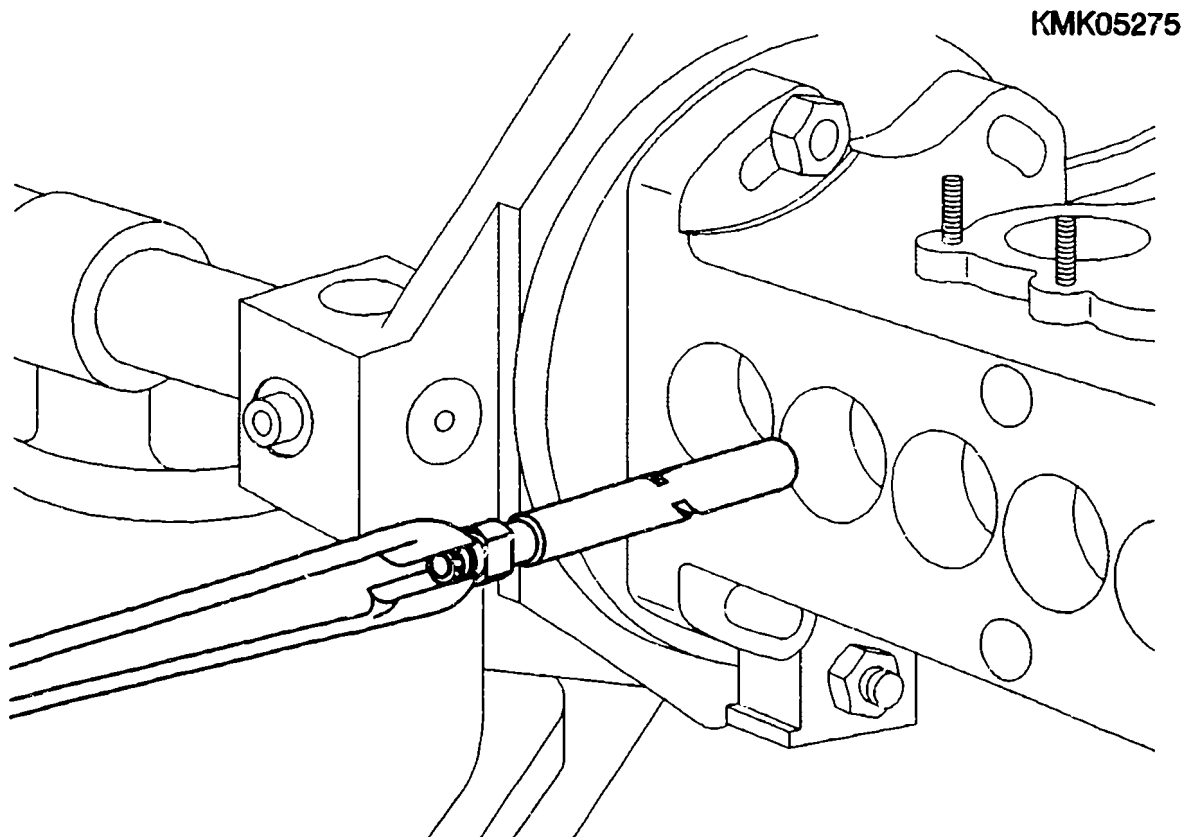
Assembly-plunger removal:

Position pump horizontally - back of pump (control-rod side) at bottom.

Use large tweezers or grippers (plastic-faced) to remove pump plunger from assembly cylinder and control lever. Place in order of removal in appropriate compartment.

Attention: Pump barrel, control lever and assembly plunger form a unit in each case and are not to be interchanged.

Continue: C08/1 Fig.: C07/2



FUEL-INJECTION PUMP DISASSEMBLY

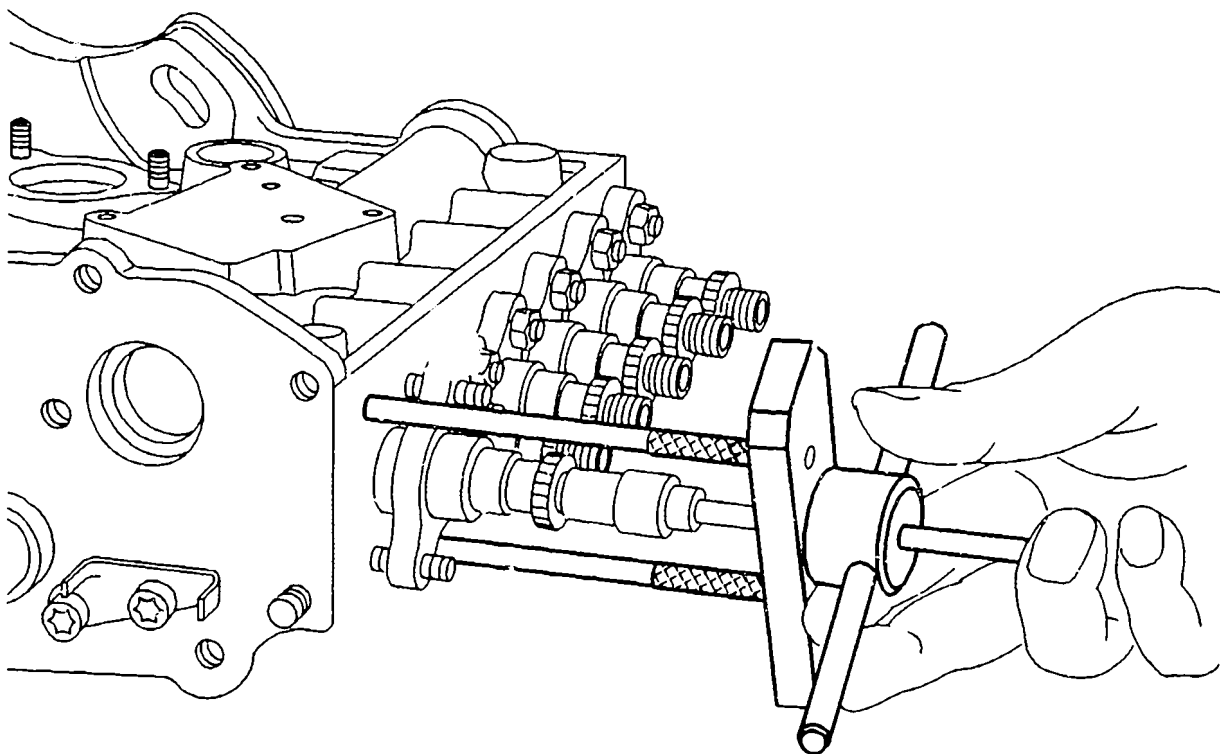
Removing barrel-and-valve assemblies:

Leave pump horizontal. Unscrew fastening nuts of barrel-and-valve assemblies.

Use extractor 0 986 612 397 to loosen assemblies and pull them carefully out of pump housing. Make sure that control lever remains in window of assembly cylinder and does not tilt. Place barrel-and-valve assemblies in correct sequence with respect to pump plungers removed beforehand in appropriate compartment. Remove any seal rings still in housing.

Continue: C09/1 Fig.: C08/2

KMK05276



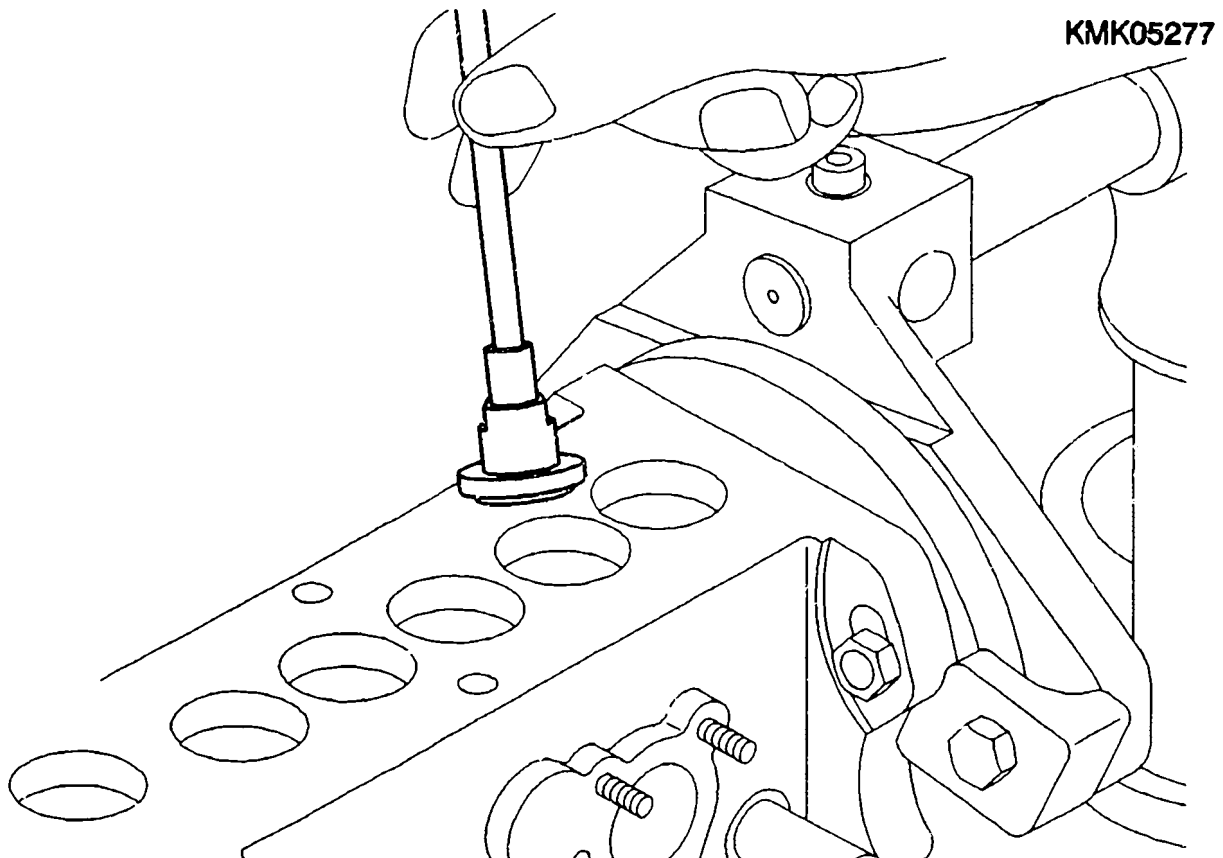
FUEL-INJECTION PUMP DISASSEMBLY

Removing control sleeves with upper spring seats:

Turn pump downwards again (base at top).

Insert assembly wrench 0 986 611 738 into control sleeves and turn slightly. Hold control rod by hand roughly in center position and carefully remove control sleeves with upper spring seat. Take care not to tilt, so that spring seat does not remain in tappet hole.

Continue: C10/1 Fig.: C09/2

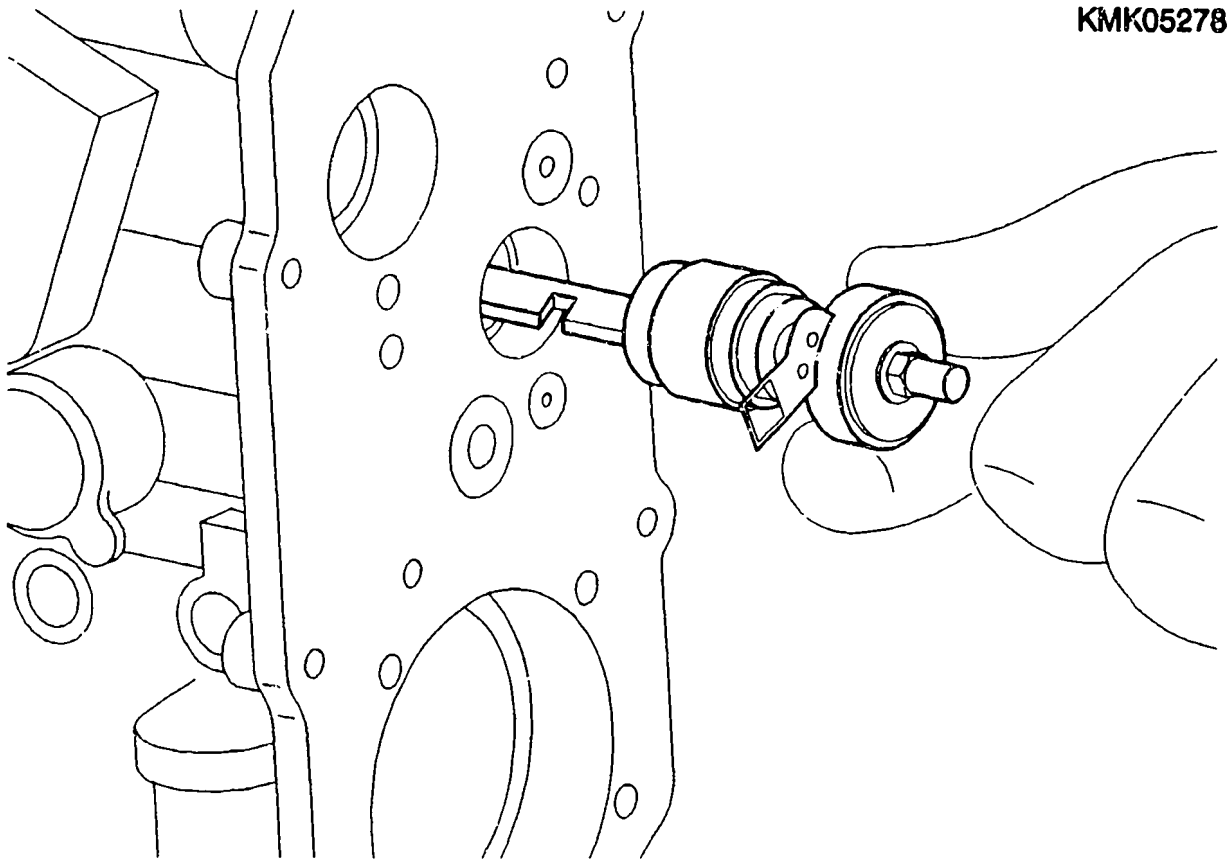


FUEL-INJECTION PUMP DISASSEMBLY

Removing control rod:

Use wrench to screw out governor-end bushing of control rod (two flats). Remove complete control rod with bushing, spring and spring seat with short-circuiting ring.

Continue: C11/1 Fig.: C10/2

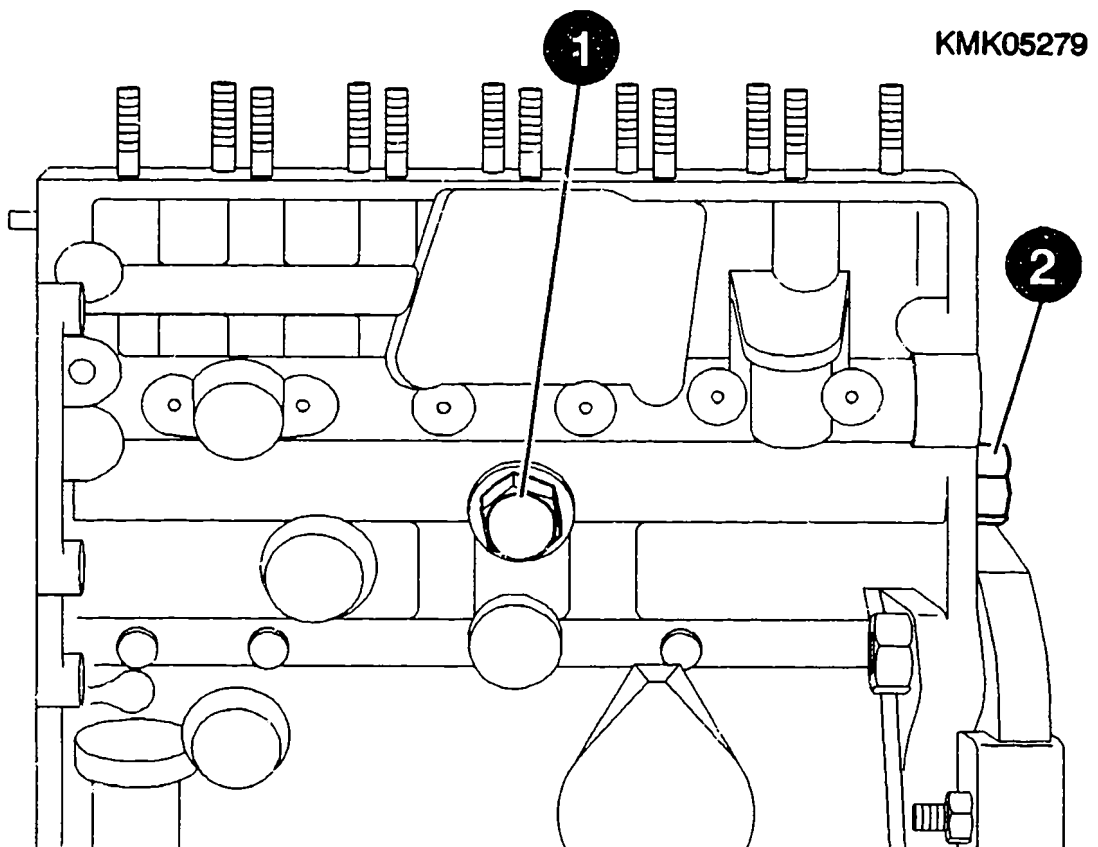


FUEL-INJECTION PUMP DISASSEMBLY

Unscrew cap nut of control-rod guide screw (thread-reel guide, 1) and measure/note down guide screw projection for subsequent re-installation. Screw cut/screw off guide screw and drive-end cap nut (2).

Note: The drive-end control-rod guide bushing is pressed in and secured by way of a bonded-in threaded bushing and a pressed-in positioning pin. The guide bushing cannot be removed with the means available to a workshop; replace pump housing in the event of wear.

Continue: N27/2 Fig.: C11/2



COMPONENT CLEANING

Wash out all parts in standard cleaning agent such as chlorothene NU which is not readily flammable and then blow out with compressed air.

Re-usable parts, which are to be stored for lengthy periods, should be covered and protected against dirt/rust.

If the RE positioner has to be cleaned prior to attachment, cleaning agent must not be allowed to ingress into the armature gap and vent duct. Exercise extreme caution when cleaning.

Continue: D01/2

CLEANING OF COMPONENT PARTS

Pay attention to the following safety precautions:

Order Governing Work with Flammable Liquids (Vbf) as issued by Federal Labor Ministry (BmA).

Safety regulations for handling chlorinated hydrocarbons:

For companies ZH 1/222

For employees ZH 1/129

as published by the Main Association for Industrial Mutual Indemnity Associations (Central Association for Accident Prevention and Industrial Medicine), Langwartweg 103, D-53129 Bonn.

The appropriate local regulations are to be observed in other countries.

Continue: N27/2

COMPONENT CHECKING AND REPAIR

Table of contents for component checks and repairs:

* Pump housing	D03/1
* Pump housing - stay bolt check	D04/1
* Seal rings, seals	D07/1
* Plunger-and-barrel assemblies, delivery-valve assemblies	D08/1
* Camshaft	D15/1
* Roller tappets	D17/1
* Camshaft bearing - governor end	D19/1
* Camshaft bearing - drive end	D25/1

Continue: D02/2

COMPONENT CHECKING AND REPAIR

Table of contents of component checks and repairs (continued):

* Quantity control rod, control sleeves	E01/1
* Prestroke shaft and bearing	E03/1
* Plunger springs	E06/1
* Microencapsulated screws	E07/1
* EHAB	E09/1
* Oil pump (viscous pump), disk cam	E14/1

Continue: D03/1

COMPONENT CHECKING AND REPAIR

Pump housing:

Visual checks:

- * Mechanical damage, fracture
- * Assembly bores and seats
- * Surface condition of roller-tappet holes
- * Condition of all sealing surfaces and seal-ring mounting surfaces
- * Condition of bearing seats
- * Condition of control-rod guide bushing on drive end

Renew pump housing if necessary.

Continue: D02/1

COMPONENT CHECKING AND REPAIR

Pump housing - stay bolt check:

To facilitate illustration, only two stay bolts were left in the pump housing. The following procedure applies to all of them.

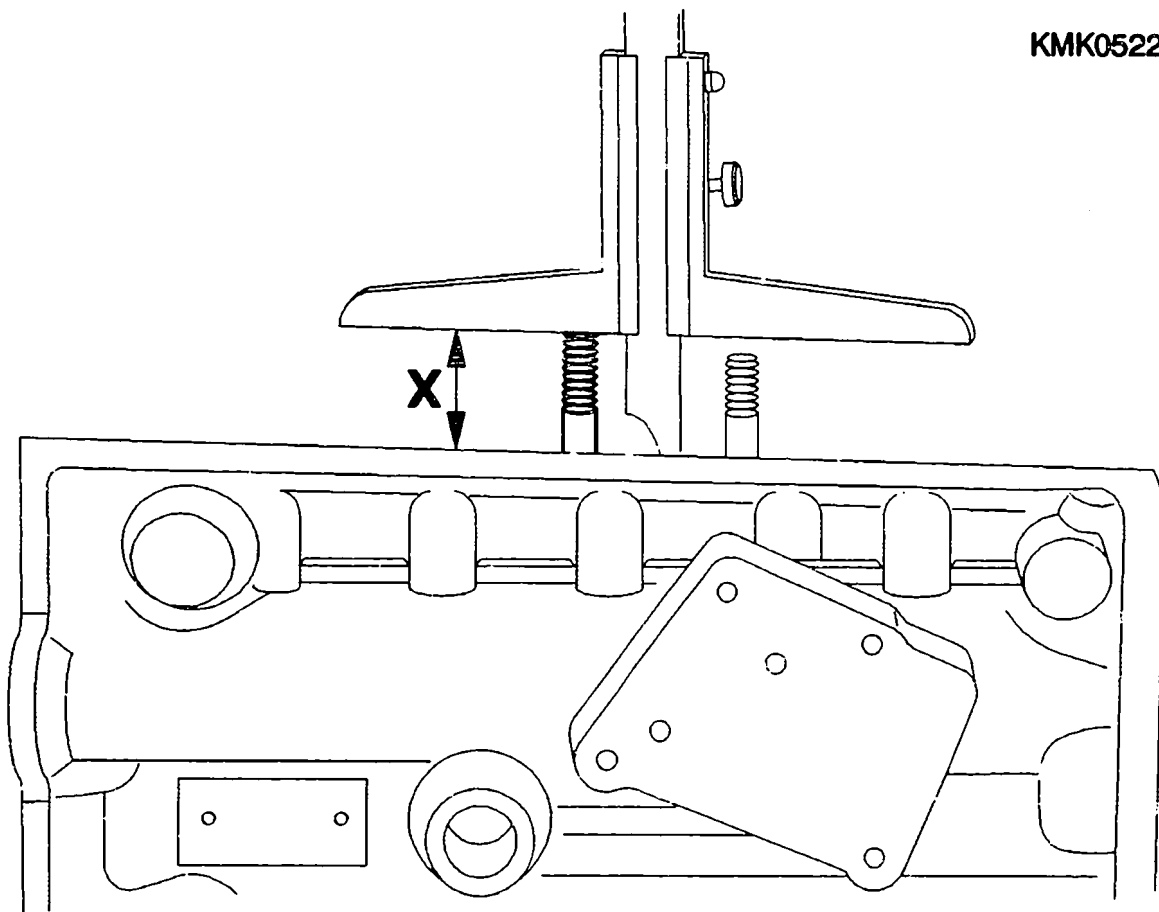
Use depth gauge to determine existing projection (dimension X).

Set values - projection (dimension X):

- Short stay bolts: max. 26.80 mm
- Long stay bolts: max. 40.30 mm

Continue: D05/1 Fig.: D04/2

KMK05223



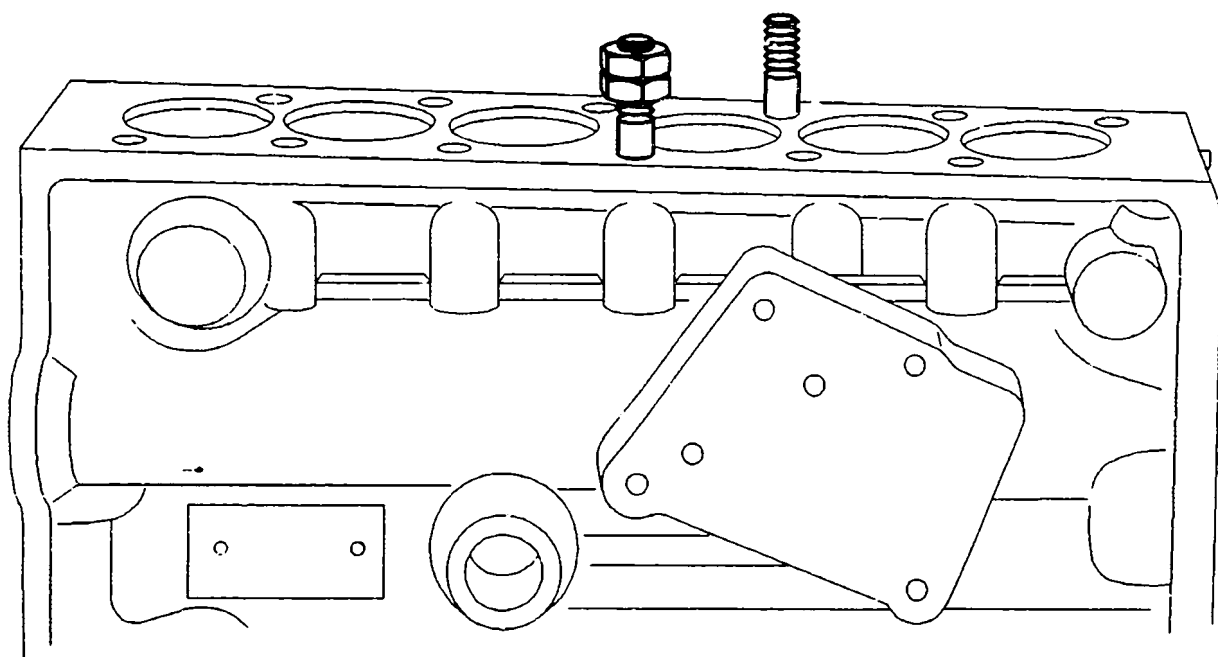
COMPONENT CHECKING AND REPAIR

Pump housing - stay bolt check:

If the determined dimension and the set value do not coincide, screw two hexagon nuts onto the stay bolt and lock them with respect to one another. One stay bolt turn must still be visible.

Continue: D06/1 Fig.: D05/2

KMK05224



COMPONENT CHECKING AND REPAIR

Pump housing - stay bolt check:

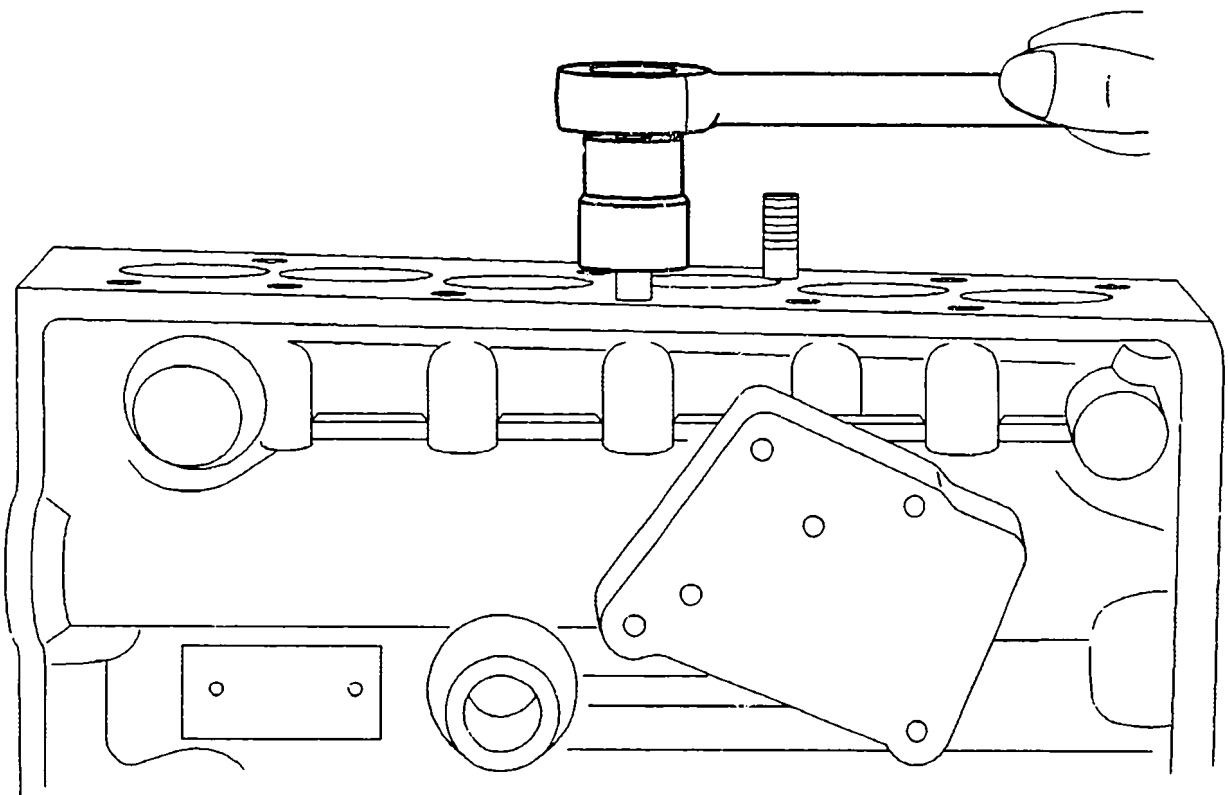
Screw in stay bolt in line with set value.

When screwing in, take care not to exceed tightening torque of 25...30 Nm.

As a final step, loosen and unscrew hexagon nuts.

Continue: D02/1 Fig.: D06/2

KMK05225



COMPONENT CHECKING AND REPAIR

Seal rings, seals:

When performing pump repairs, all seals and seal rings are to be renewed. Apply tallow to seal rings prior to installation. Where prescribed, fit seal rings using the appropriate assembly aids such as assembly sleeves.

Continue: D02/1

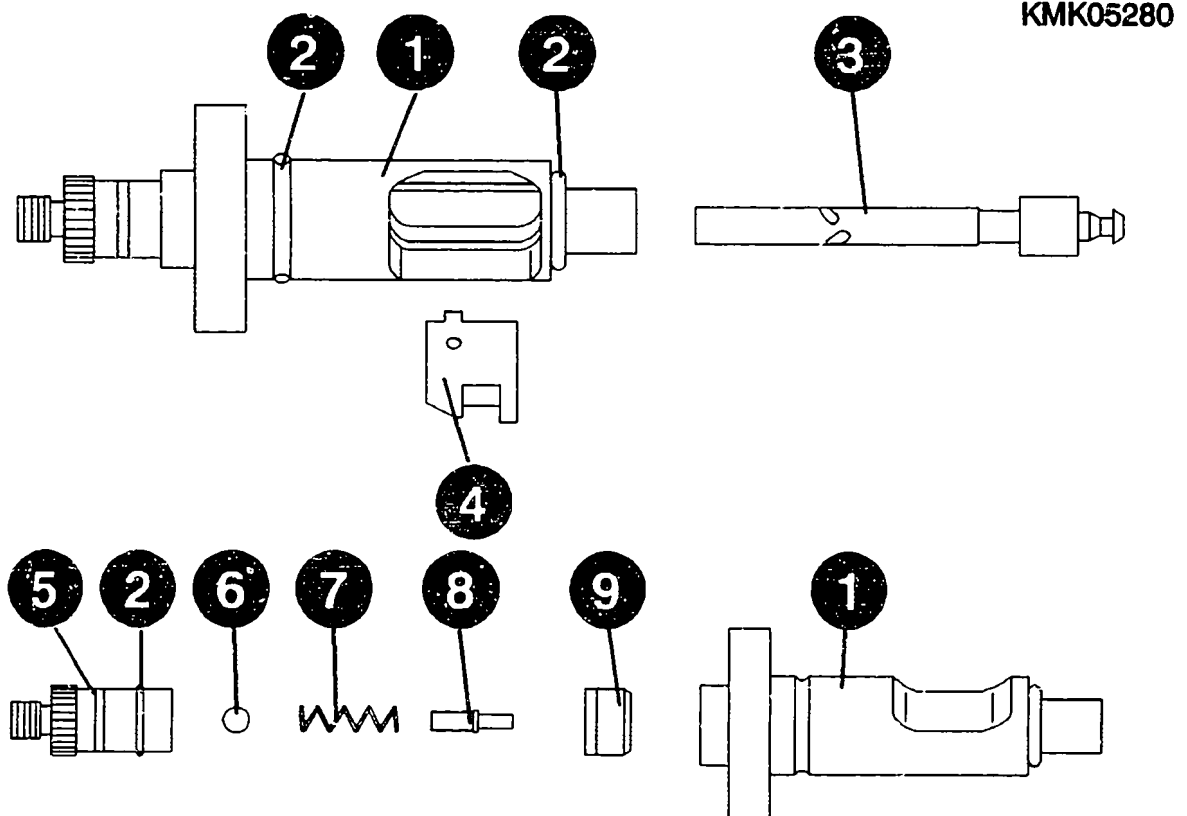
COMPONENT CHECKING AND REPAIR

Plunger-and-barrel assemblies,
delivery-valve assemblies:

Components and design of barrel-and-
valve assembly:

- 1 = Assembly cylinder with window and
guide groove for control lever
- 2 = Seal rings
- 3 = Assembly plunger
- 4 = Control lever
- 5 = Delivery-valve holder
- 6 = Guide plate
- 7 = Pressure spring
- 8 = Relief valve
- 9 = Valve body

Continue: D09/1 Fig.: D08/2



COMPONENT CHECKING AND REPAIR

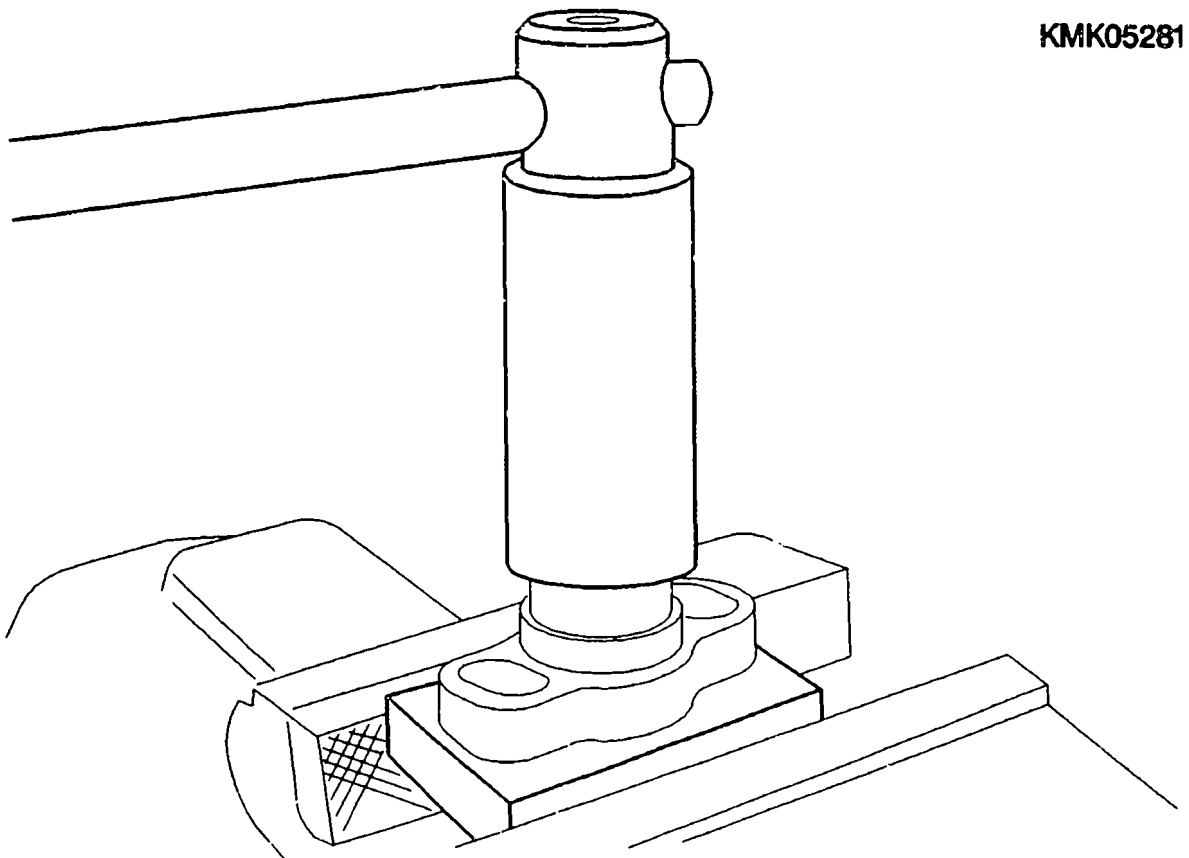
Plunger-and-barrel assemblies,
delivery-valve assemblies:

Barrel-and-valve assembly; dis-
assembly, installation:

Position barrel-and-valve assembly
in assembly device 0 986 611 356.
Loosen and tighten delivery-valve
holder with socket wrench
0 986 611 451.

There is no seal between delivery valve
and assembly cylinder.

Continue: D10/1 Fig.: D09/2



COMPONENT CHECKING AND REPAIR

Barrel-and-valve assembly; dis-assembly, installation:

Attach new O-ring for delivery-valve holder with assembly sleeve

0 986 612 606:

Apply silicone grease to O-ring, slip over assembly sleeve and push sleeve onto delivery-valve holder as far as start of recess.

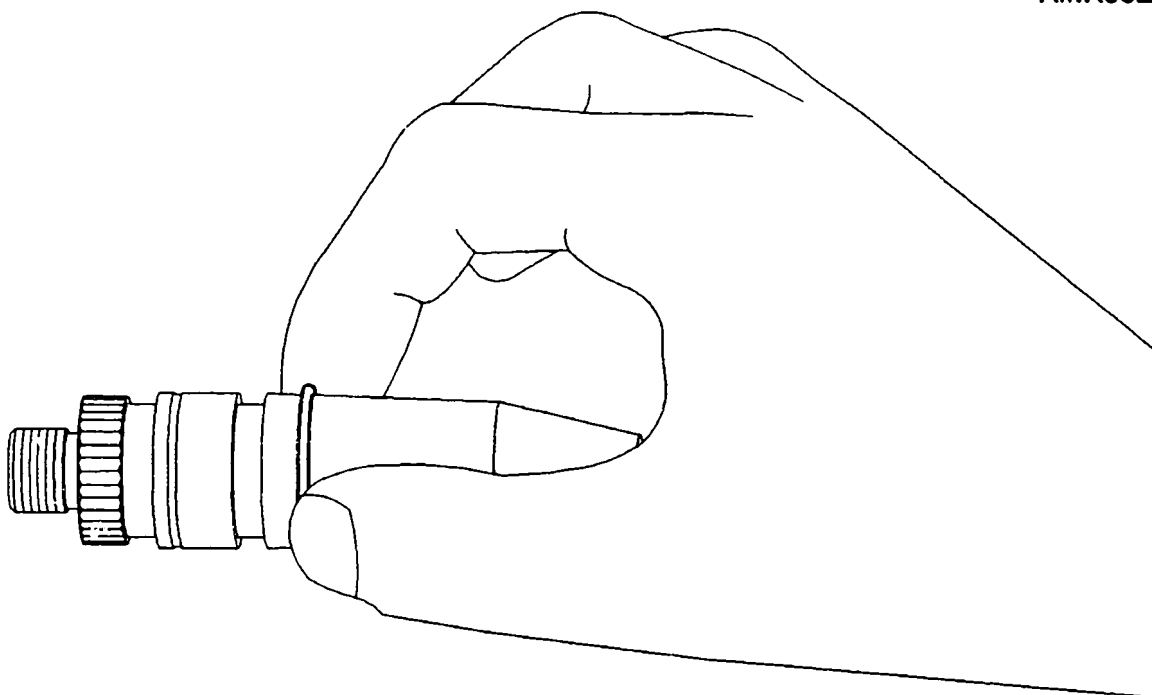
Insert O-ring into recess.

Coat thread of valve holder with mixture of tallow and oil and screw holder into pump barrel.

Tightening torque, delivery-valve holder: 110...120 Nm.

Continue: D11/1 Fig.: D10/2

KMK05219



COMPONENT CHECKING AND REPAIR

**Plunger-and-barrel assemblies,
delivery-valve assemblies:**

**Wear assessment, plunger-and-barrel
assemblies:**

**The helices of the assembly plunger
must be sharp-edged. The bearing
surfaces must not exhibit tracking or
scoring.**

Continue: D11/2

COMPONENT CHECKING AND REPAIR

**Plunger-and-barrel assemblies,
delivery-valve assemblies:**

**Further assessment by way of slide
test:**

**Wash out all parts in calibrating oil,
insert control lever in window -
bevel at top, guide lug in guide
groove. Carefully insert assembly
plunger into barrel.**

**Weight of plunger must cause it to
slide downwards. This likewise
applies to the control lever on the
plunger.**

**Pay attention to additional information
on following Coordinate.**

Continue: D12/1

COMPONENT CHECKING AND REPAIR

Plunger-and-barrel assemblies,
delivery-valve assemblies:

Further information: Renewal of
plunger-and-barrel assemblies is not
justified with:

- * Slight cavitation which is not
directly at the helices.
- * Matt areas over the entire periphery.
- * Bright areas not involving scoring
and mechanical wear.
- * Discoloration at plunger and barrel
due to fuel residue or water in
fuel. Such residues can usually be
washed off, thus enabling tests to be
passed.

Continue: D12/2

COMPONENT CHECKING AND REPAIR

Plunger-and-barrel assemblies,
delivery-valve assemblies:

Additional information:

Renewal of the plunger-and-barrel
assemblies is justified in the case of

- * Cavitation directly at the helices.
- * Signs of seizure or sticking as a
result of dirt or foreign matter.
- * Failure to comply with requirements
of slide test.
- * Wear at control lever;
see following Coordinate.

Continue: D13/1

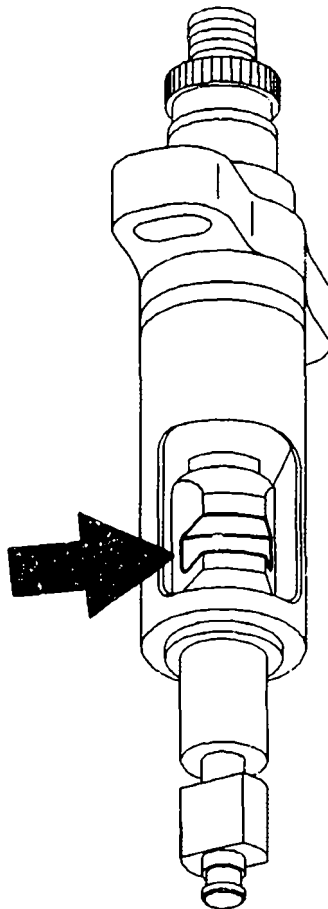
COMPONENT CHECKING AND REPAIR

Plunger-and-barrel assemblies,
delivery-valve assemblies:

The transverse driver groove in the control lever (arrow) must not show any signs of wear in the engagement area of the prestroke-shaft ball head. Experiment by inserting non-worn ball head of prestroke shaft into groove. There must not be any stiffness, but at the same time no noticeable play.

Note on wear: Assembly cylinder, plunger and control lever form a unit which always has to be replaced in its entirety.

Continue: D14/1 Fig.: D13/2



KMK05282

COMPONENT CHECKING AND REPAIR

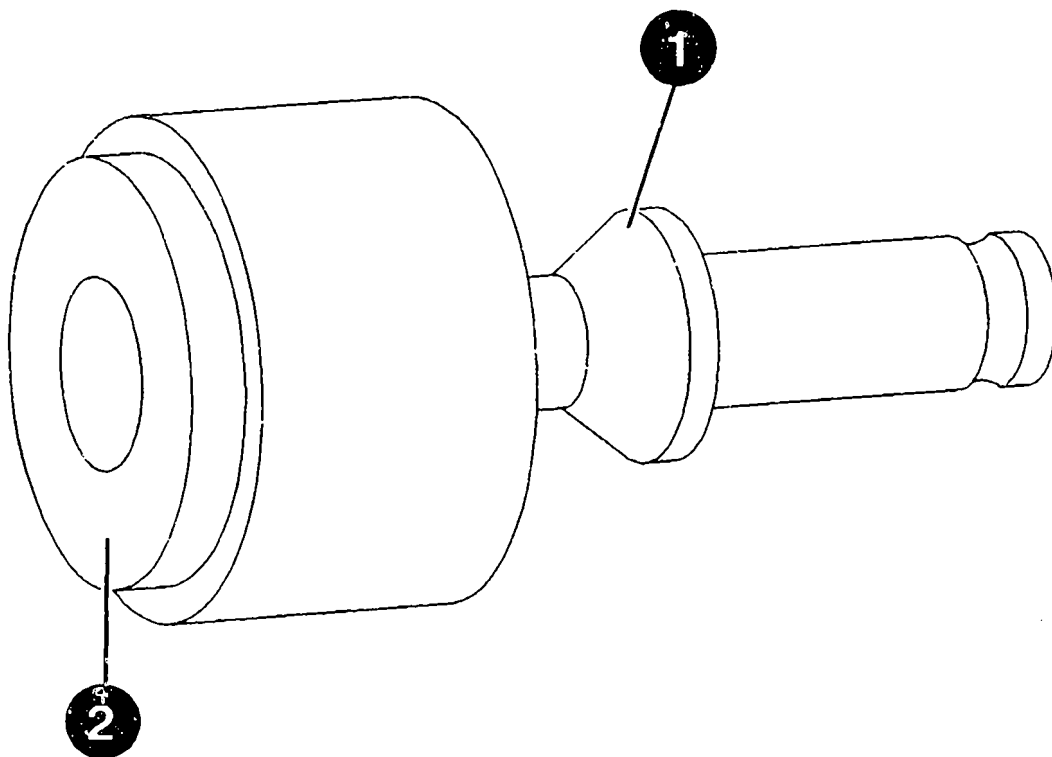
Plunger-and-barrel assemblies,
delivery-valve assemblies:

The conical seat of valve taper and valve body (1) on the delivery valve must not be damaged, unevenly worn or show signs of cavitation. The same applies to the sealing surface of the valve body (2, support surface at assembly cylinder). The valve washed out in calibrating oil must slide onto the valve seat in the valve body by virtue of its own weight.

Replace defective delivery-valve assemblies.

Continue: D02/1 Fig.: D14/2

KMK05217



COMPONENT CHECKING AND REPAIR

Camshaft:

Renew the camshaft if it reveals pronounced running marks (arrows) or if a taper (1) is damaged.

If the roller tappet (2) shows corresponding signs of wear, this is likewise to be replaced.

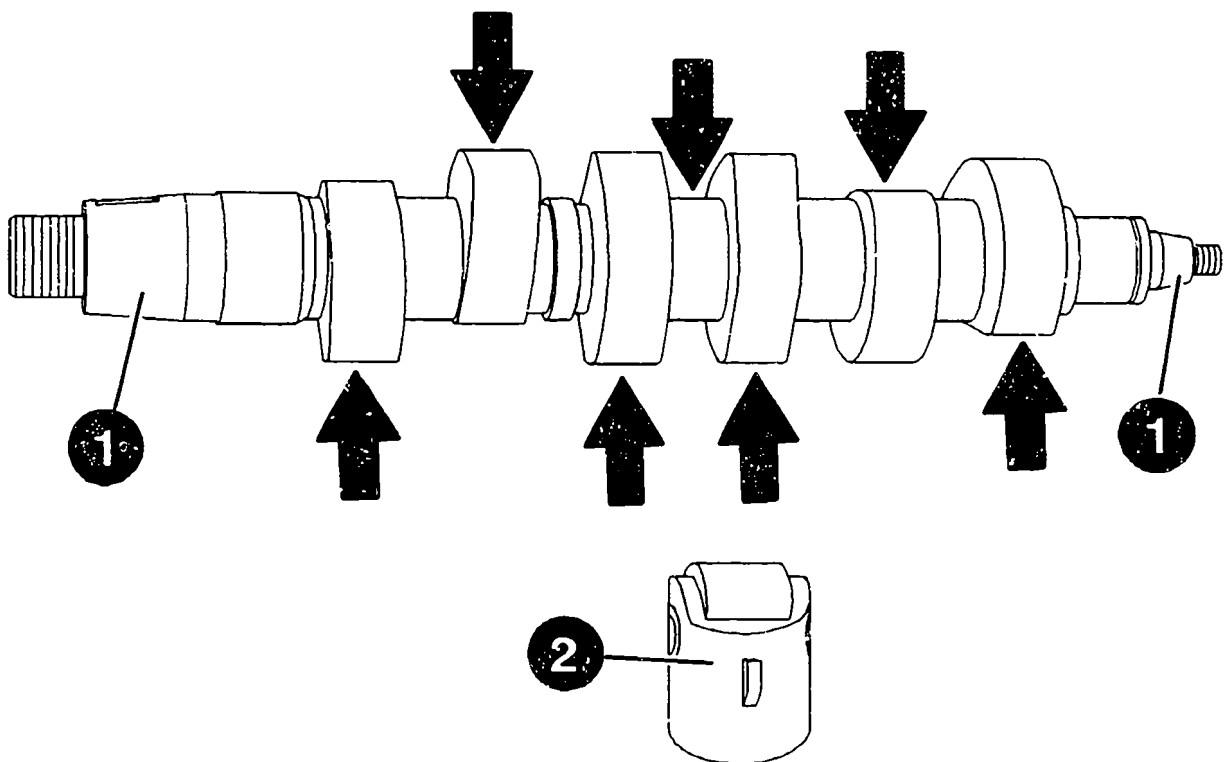
The replacement of roller tappets always results in camshaft renewal.

If an intermediate bearing reveals running marks, it is to be replaced.

If roller-tappet-shell seizure does not damage the camshaft, then it can be re-used.

Continue: D16/1 Fig.: D15/2

KMK01257



COMPONENT CHECKING AND REPAIR

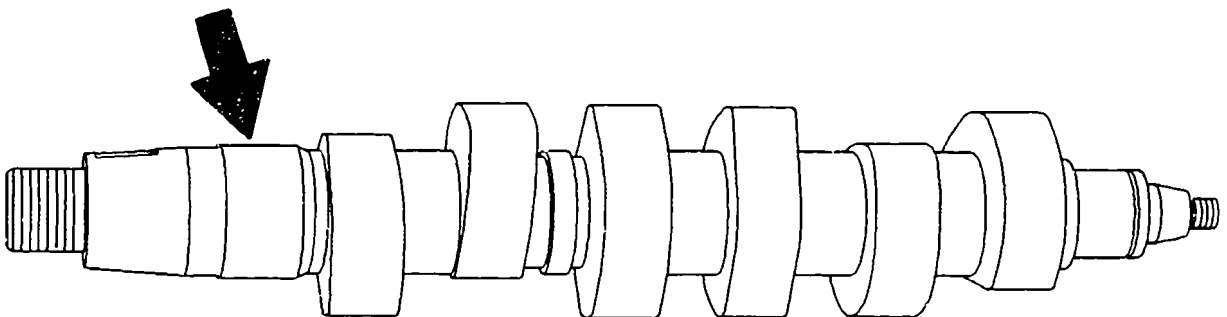
Camshaft:

When checking the camshaft, attention is also to be paid to the bearing surface of the drive-end cylindrical roller bearing (the rollers run directly on the camshaft).

The bearing surface must not exhibit wear, traces of seizure or the like, scoring or temperature-induced discoloration.

Continue: D02/1 Fig.: D16/2

KMK05283



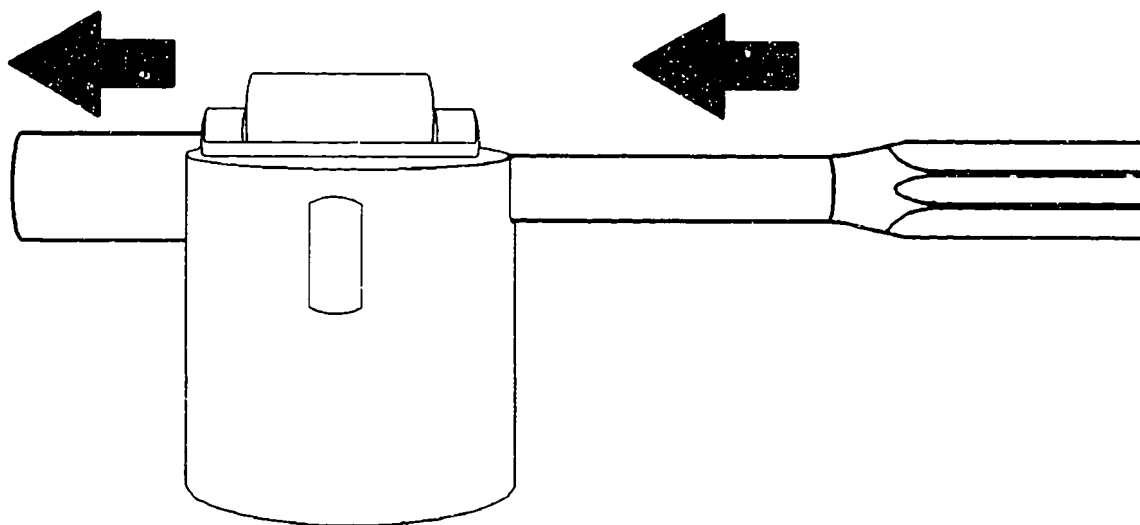
COMPONENT CHECKING AND REPAIR

Roller tappets:

The bearing surfaces of the roller tappets must not reveal any signs of seizure. The rollers are to be checked for damage, running marks and bearing-pin play. If damaged cams are found, the rollers and, where applicable, the bearing pins are to be replaced. Use brass drift punch to press roller pin out of roller tappet from circlip side. Scrap circlip.

Continue: D18/1 Fig.: D17/2

KMK03650



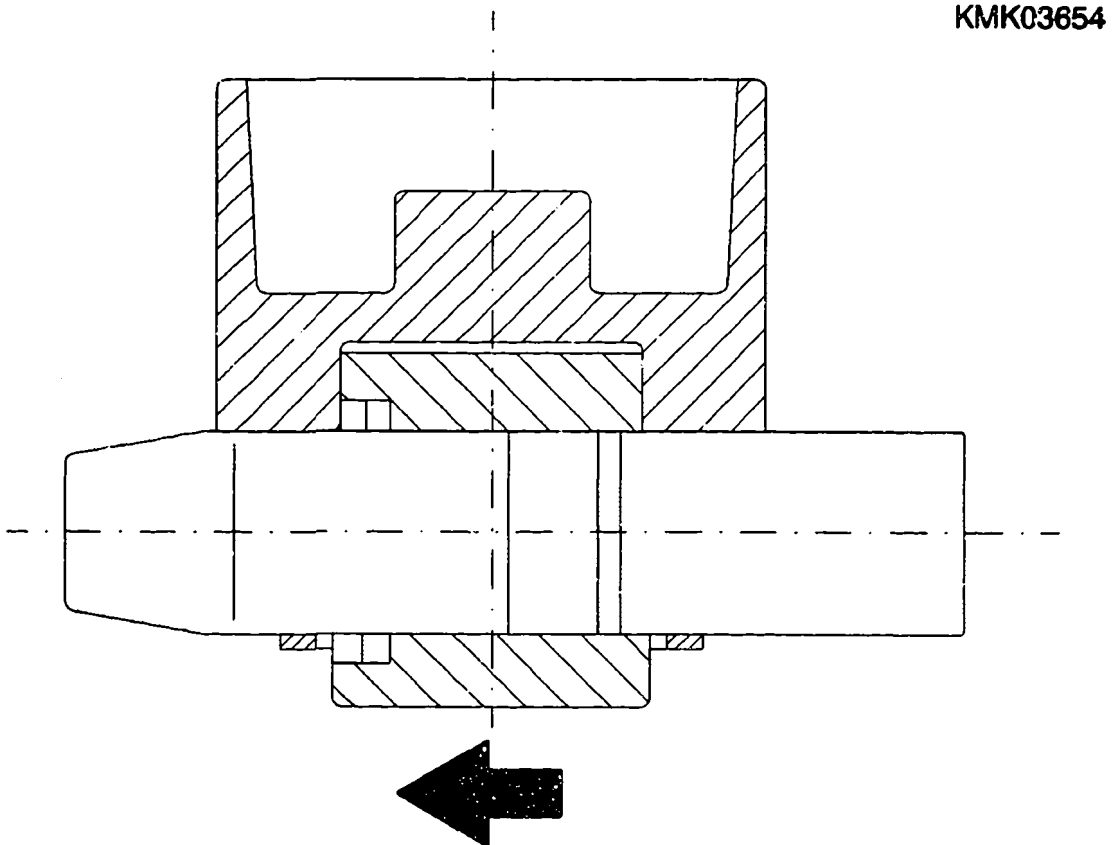
COMPONENT CHECKING AND REPAIR

Roller tappets:

If worn, renew roller and roller pin and install in roller-tappet shell:

Insert tappet roller with new circlip in roller-tappet shell. Insert centering mandrel 0 986 642 492, tapered side first, from side opposite circlip. Coat roller pin with molycote grease and insert notch first into roller-tappet shell until circlip engages. This presses the centering mandrel out of the shell.

Continue: D02/1 Fig.: D18/2



COMPONENT CHECKING AND REPAIR

Camshaft bearing - governor end:

Depending on pump version use is made of cylindrical roller bearings or self-aligning roller bearings.

The rollers and surfaces of both types are not to exhibit any signs of wear or seizure. To assess, outer race can be pushed back slightly on cylindrical roller bearing (do not pull off, as rollers would fall out). With self-aligning roller bearing, swivel outer race slightly on rollers.

Continue: D19/2

COMPONENT CHECKING AND REPAIR

Camshaft bearing - governor end:

Even after cleaning, both types have only minimal play. Turning the outer race must not produce any noise and there should be no signs of stiffness.

Replace damaged bearing.

Continue: D20/1

COMPONENT CHECKING AND REPAIR

Camshaft bearing - governor end:

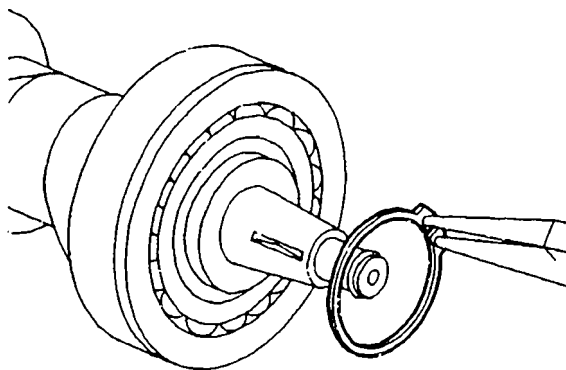
Bearing replacement:

Procedure is the same for both types.

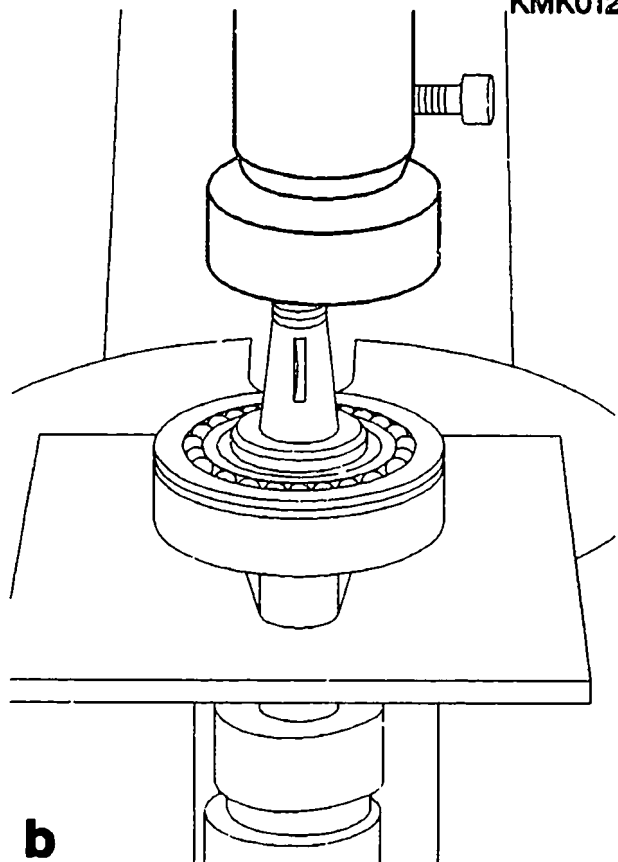
On self-aligning roller bearing, remove circlip from camshaft (a).

Guide pressing-off plate 0 986 612 134 under bearing such that bearing inner race rests on plate; the two camshaft surfaces are then located in the plate recess. Press camshaft out of bearing such that force is only assumed by bearing inner race (b).

Continue: D21/1 Fig.: D20/2



a



b

COMPONENT CHECKING AND REPAIR

Camshaft bearing - governor end:

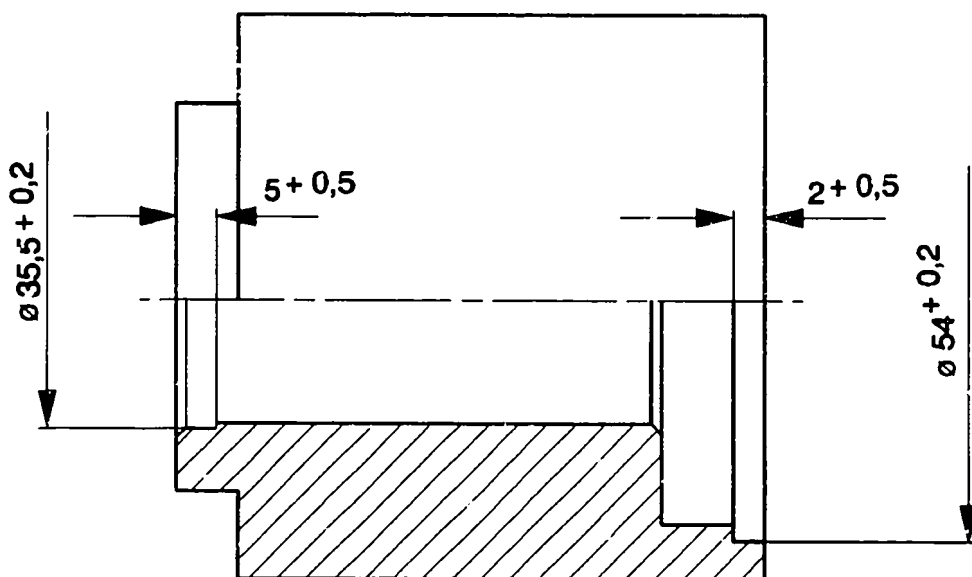
Bearing installation: Assembly with pressing-in tool 0 986 612 065 and guide bushing 0 986 612 493 as accessory.

Note: The existing pressing-in tool is to be recessed as shown at the marked locations (arrows). The tool surface is hardened!

Allowance has been made for this modification on tools delivered as of mid 1994.

Continue: D22/1 Fig.: D21/2

KMK05197



COMPONENT CHECKING AND REPAIR

Camshaft bearing - governor end

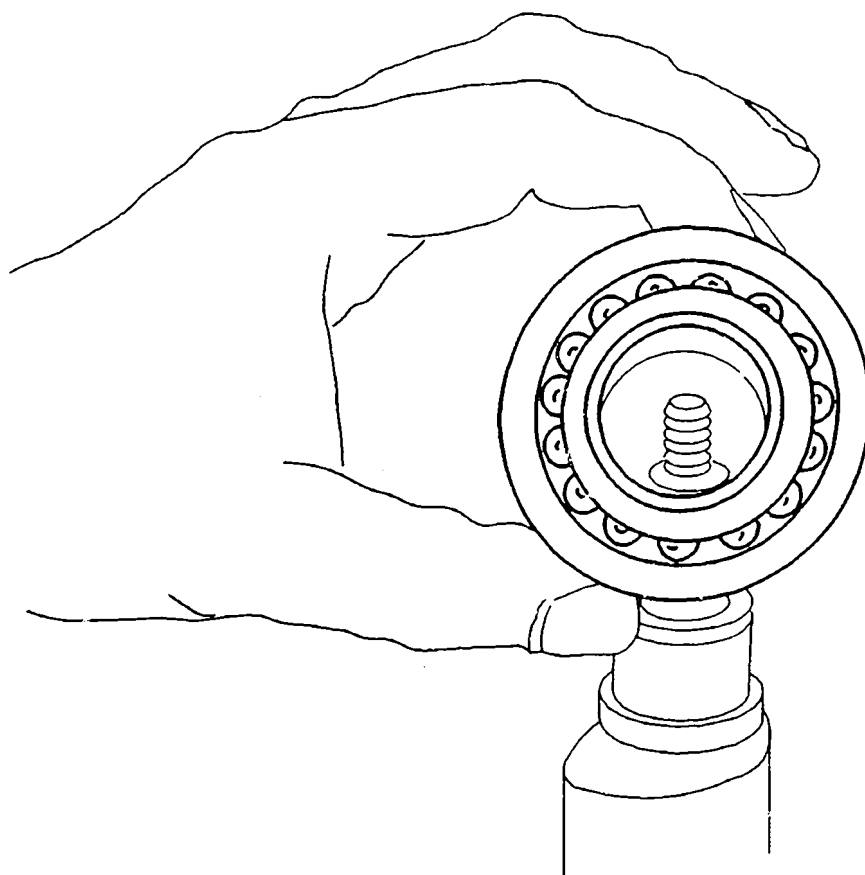
Place camshaft on press and provisionally attach bearing as follows:

Self-aligning roller bearing: Pull-off groove at bearing outer race at top.

Cylindrical roller bearing: Thrust ring at bottom so that it is on inside in housing on subsequent assembly.

Continue: D23/1 Fig.: D22/2

KMK01269



COMPONENT CHECKING AND REPAIR

Camshaft bearing - governor end:

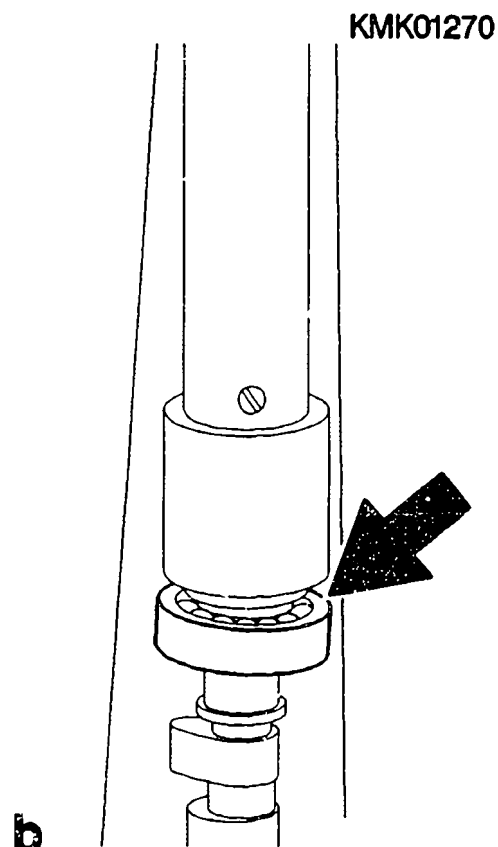
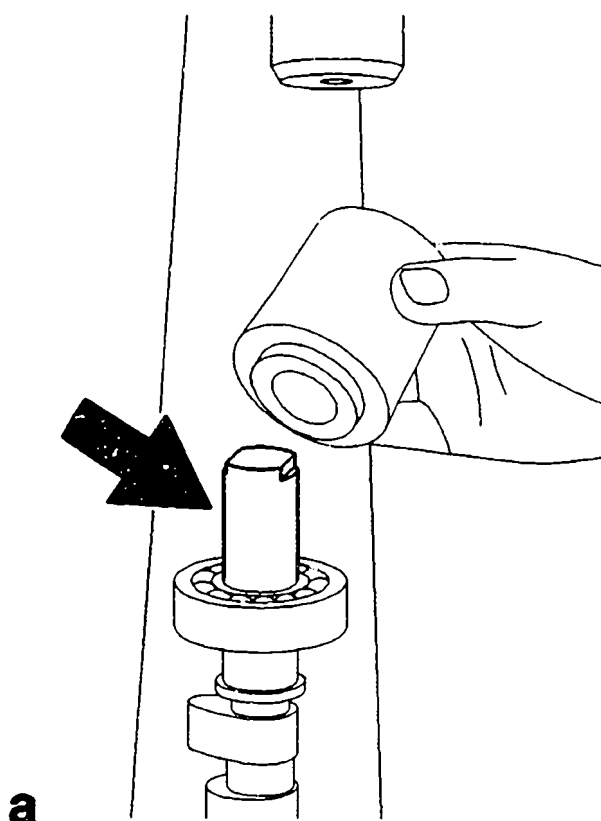
Screw guide bushing 0 986 612 493 onto thread of camshaft (a).

Position pressing-in tool

0 986 612 065 over guide bushing such that machined collar is on bearing inner race (b),

Press bearing as far as it will go onto bearing seat of camshaft.

Continue: D24/1 Fig.: D23/2

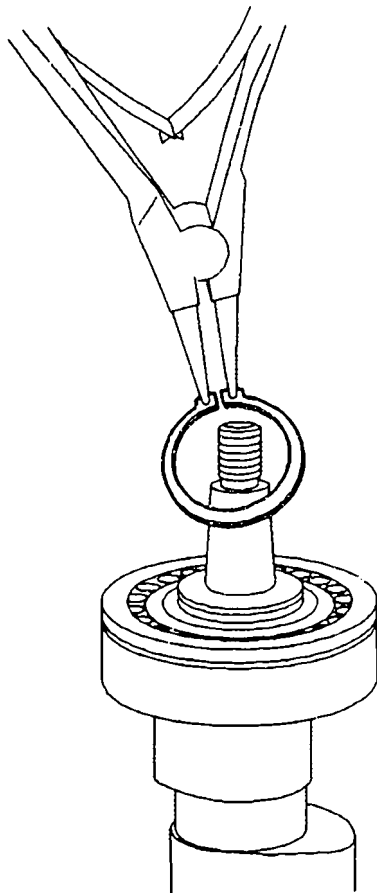


COMPONENT CHECKING AND REPAIR

Camshaft bearing - governor end:

Fit shaft circlip on self-aligning roller bearing.

Continue: D02/1 Fig.: D24/2



KMK01271

COMPONENT CHECKING AND REPAIR

Camshaft bearing - drive end:

The drive-end cylindrical roller bearing runs directly on the camshaft and does not have an inner race. The rollers cannot be taken out of the roller ring.

On visual inspection the rollers must not exhibit signs of wear/seizure or temperature-induced discoloration. Attach complete cleaned bearing to camshaft and turn it. There should be no noise or stiffness. Replace defective bearing.

Continue: D26/1

COMPONENT CHECKING AND REPAIR

Camshaft bearing - drive end:

Replacing cylindrical roller bearing in drive flange:

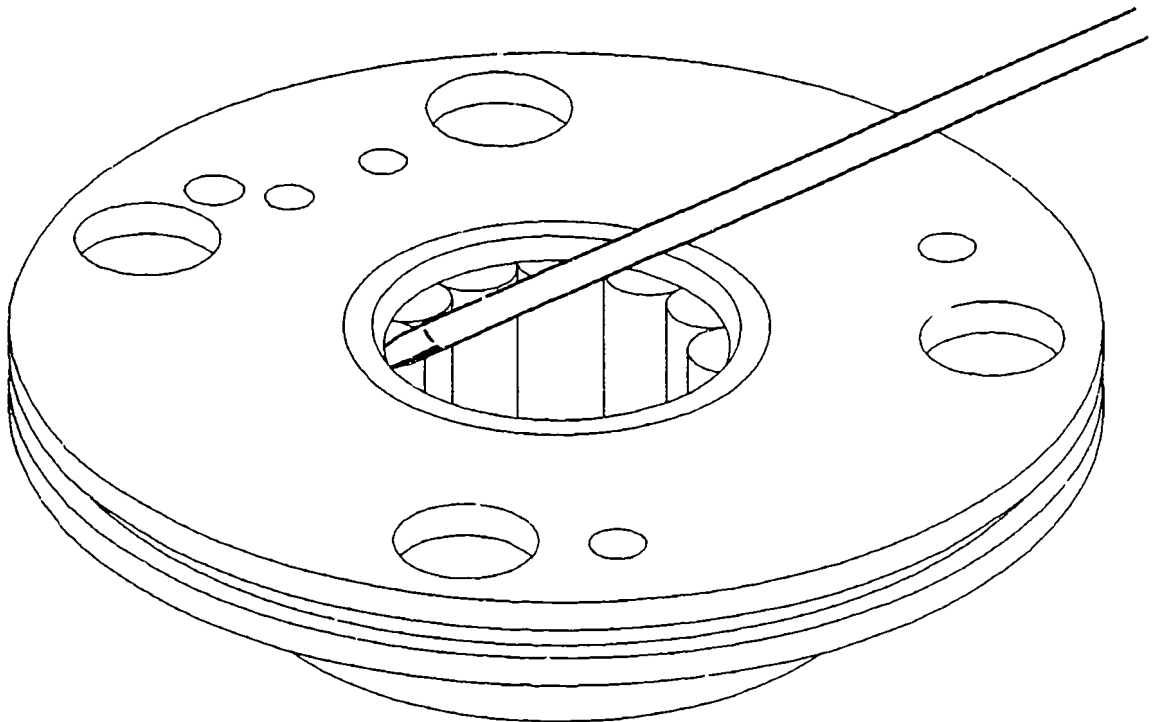
Note: Replacement destroys the bearing and it is not to be re-used.

Use screwdriver to lever out radial-lip-type oil seal in bearing flange.

Note: The oil seal is destroyed and is not to be re-used.

Continue: D27/1 Fig.: D26/2

KMK05284



COMPONENT CHECKING AND REPAIR

Camshaft bearing - drive end:

Pressing out cylindrical roller bearing:

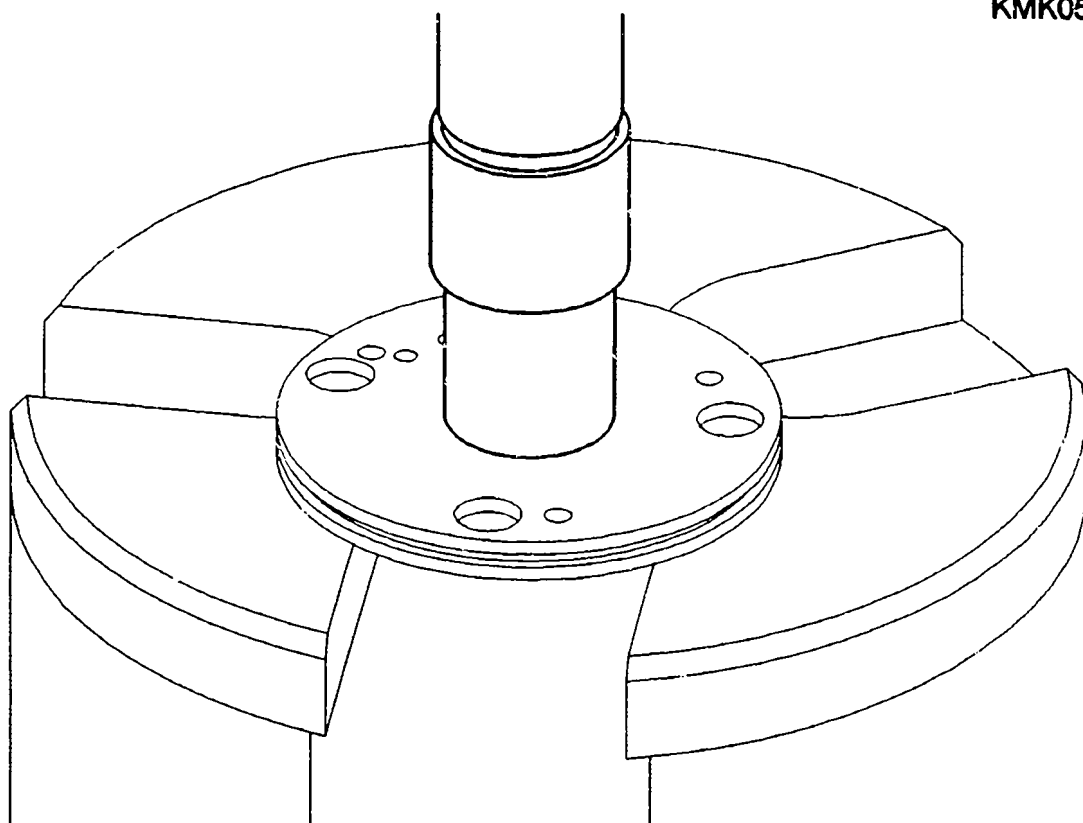
Position bearing flange - pilot diameter at bottom - on press such that bearing outer race is free.

Use pressing-out mandrel 0 986 612 648 (diameter in line with bearing size, end face of tool makes contact with rollers) to press bearing out of flange.

Note: This destroys the bearing and it must be replaced.

Continue: D28/1 Fig.: D27/2

KMK05285



COMPONENT CHECKING AND REPAIR

Camshaft bearing - drive end:

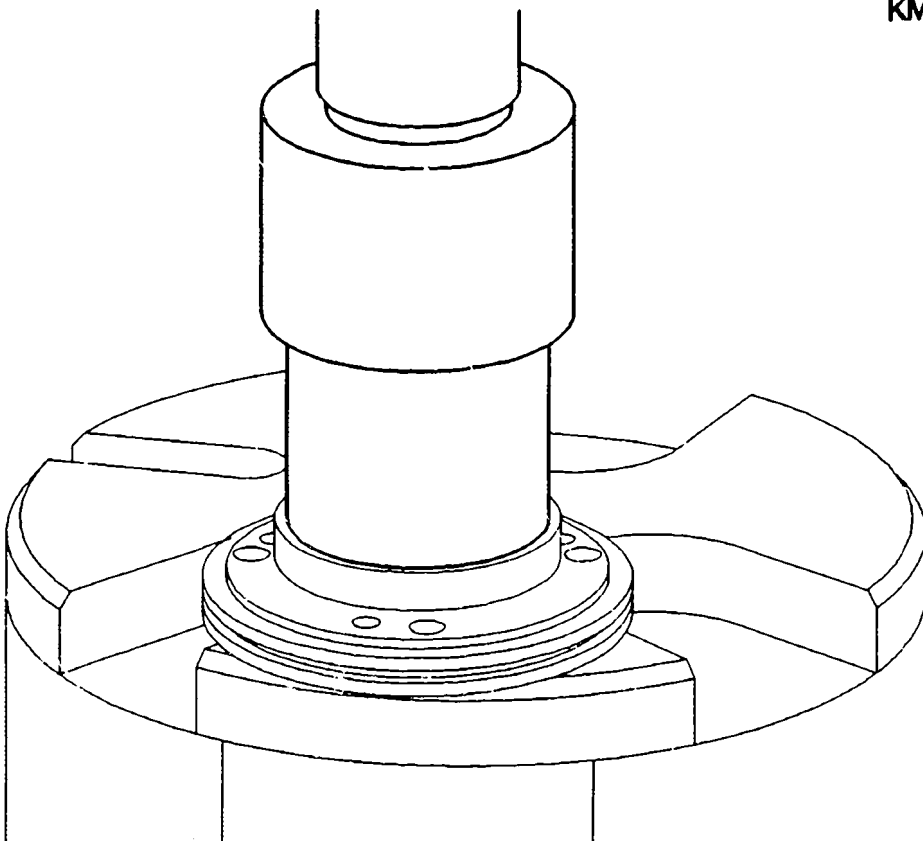
Pressing new cylindrical roller bearing into flange:

Position bearing on flange such that labelled side is at top, i.e. labelled side must be visible after pressing in. Press in bearing with pressing-in tool 0 986 612 647 (tool diameter in line with bearing OD) as far as it will go.

Note: The radial-lip-type oil seal is fitted after camshaft assembly.

Continue: D02/2 Fig.: D28/2

KMK05286



COMPONENT CHECKING AND REPAIR

Quantity control rod, control sleeves:

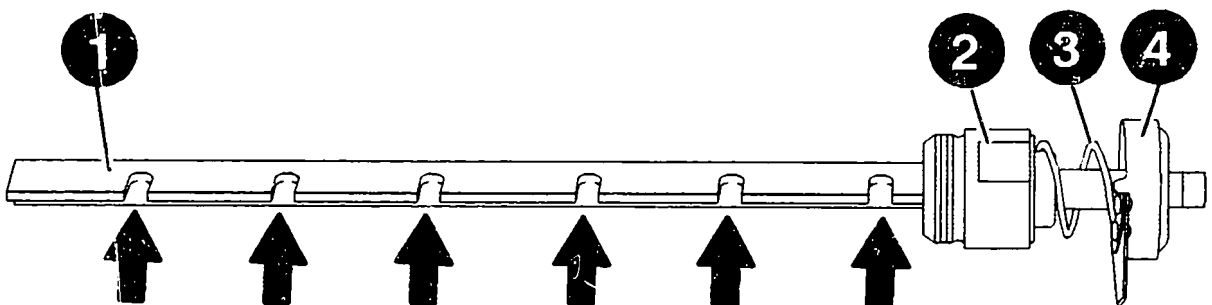
The quantity control rod (1) forms a unit together with the governor-end bushing (2) with seal ring, spring (3) and dished washer (4) with riveted-on RPS short-circuiting ring and can only be replaced in its entirety.

Pay attention to the following points when checking:

No obvious wear in area of drive-end angle mount - small bright patches can be ignored.

Continue: E02/1 Fig.: E01/2

KMK05287



COMPONENT CHECKING AND REPAIR

Quantity control rod, control sleeves:

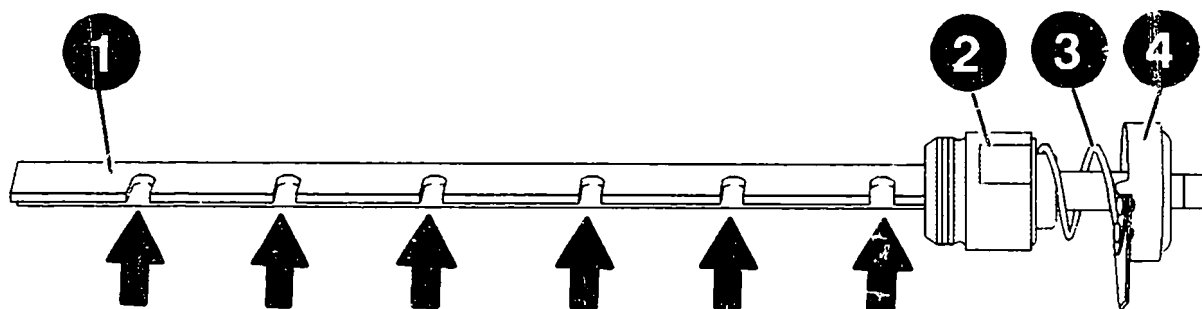
The control rod must not be bent, particularly in the area of the bushing, the dished washer and the short-circuiting ring.

The control-sleeve driver slots (arrows) and the ball heads of the control sleeves must not be worn. The ball head inserted in the slot must not catch and there must be no noticeable play.

Replace defective control rod.

Continue: D02/2 Fig.: E02/2

KMK05287

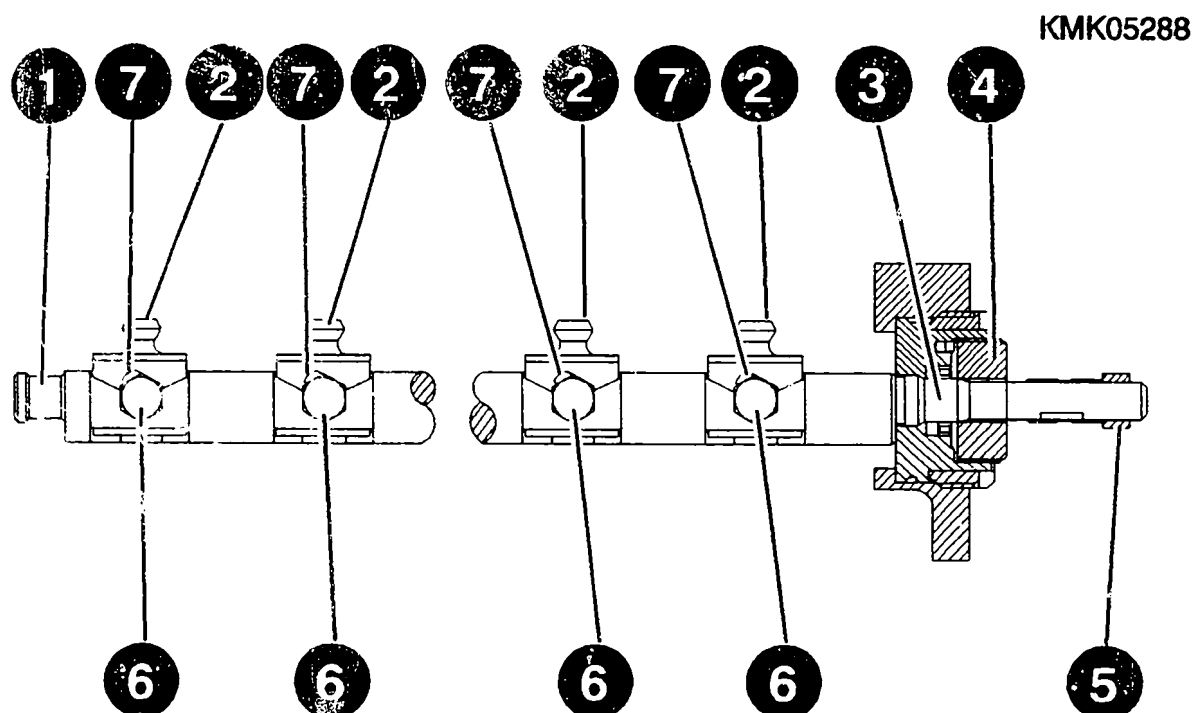


COMPONENT CHECKING AND REPAIR

Prestroke shaft and bearing:

- 1 = Shaft bearing - drive end
- 2 = Driver with ball head (rider)
- 3 = Shaft bearing - governor end
- 4 = Bearing, complete
- 5 = Assembly sleeve for protecting bearing seal ring
- 6 = Driver fastening screws
- 7 = Washers

Continue: E04/1 Fig.: E03/2



COMPONENT CHECKING AND REPAIR

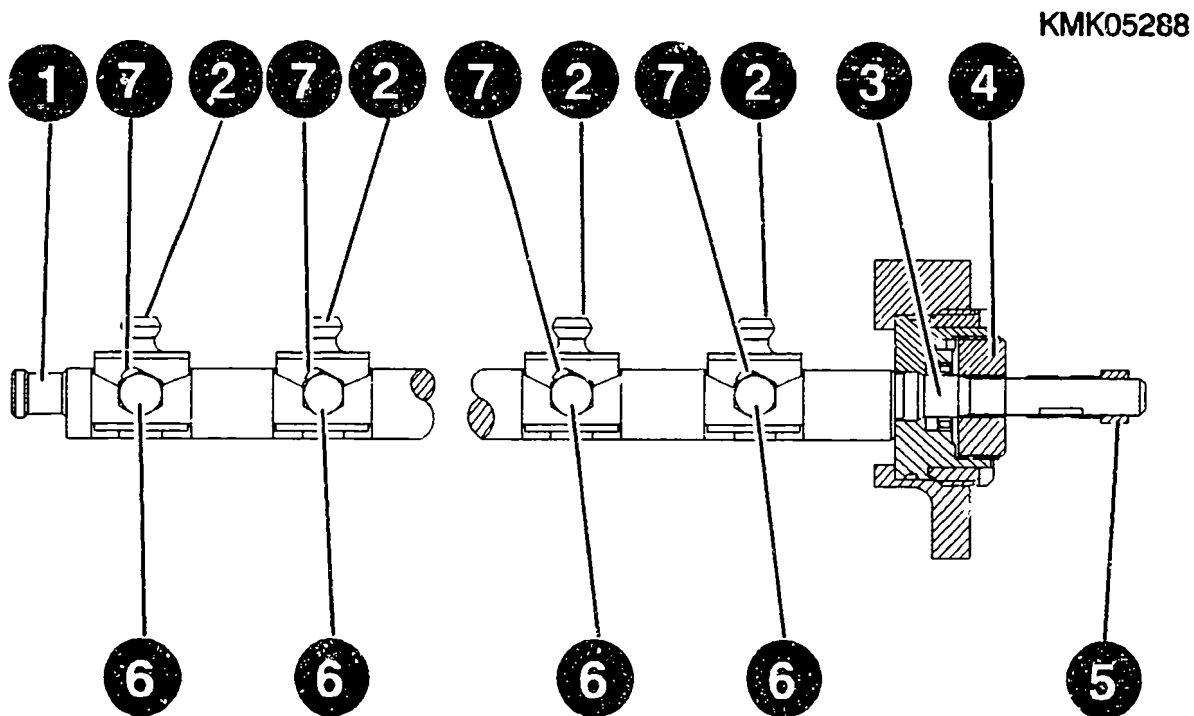
Prestroke shaft and bearing:

The prestroke shaft must not be bent (straightening is not permitted).

The bearing points on either side must not show any obvious signs of wear. There must be no flattening of the ball heads of the drivers (riders) in the area in which they engage in the control rods.

If no pump components have been replaced, the shims beneath the drivers should be left in position. Otherwise: Preassembly of shaft with 1.9 mm shims. In this case: Do not bend over washers.

Continue: E05/1 Fig. E04/2



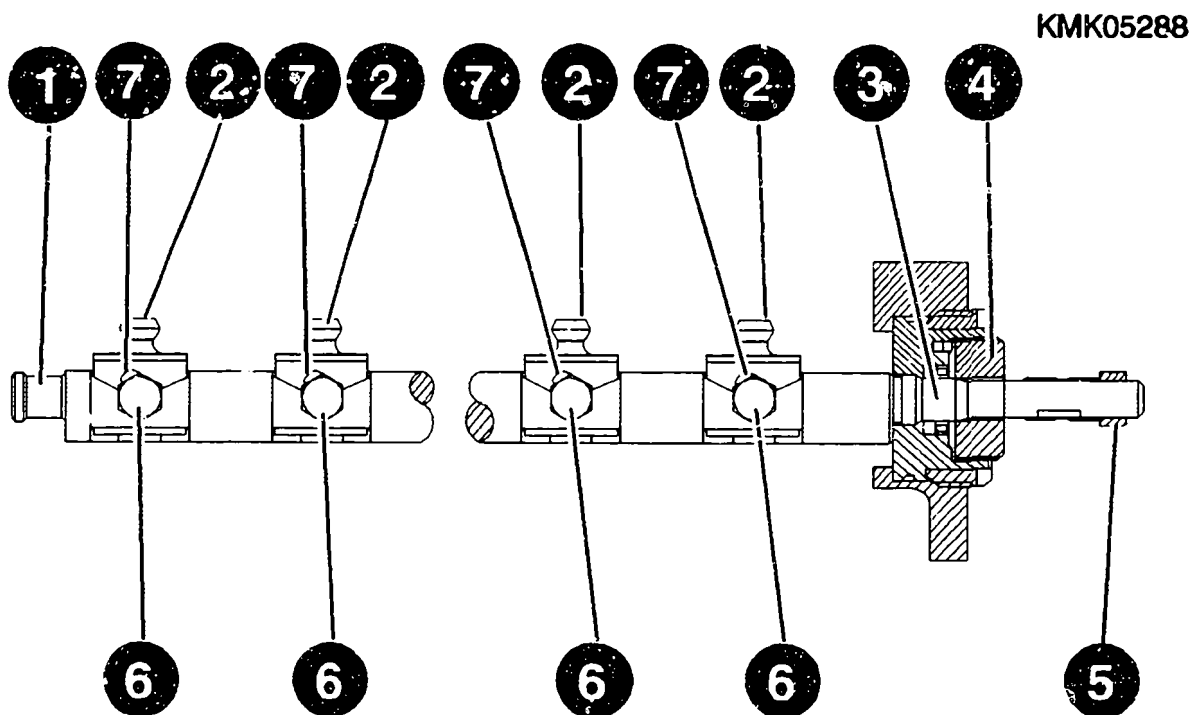
COMPONENT CHECKING AND REPAIR

Prestroke shaft and bearing:

The prestroke shaft bearing is a complete unit which is only available as an assembly. The bearing contains a seal ring with a sensitive sealing lip (suction gallery seal). To protect this seal ring, the bearing may only be slipped onto the prestroke shaft making use of the assembly sleeve 0 986 612 639. In cases of doubt and after lengthy service, the bearing is to be renewed.

The outer O-ring is always to be renewed.

Continue: D02/2 Fig.: E05/2



COMPONENT CHECKING AND REPAIR

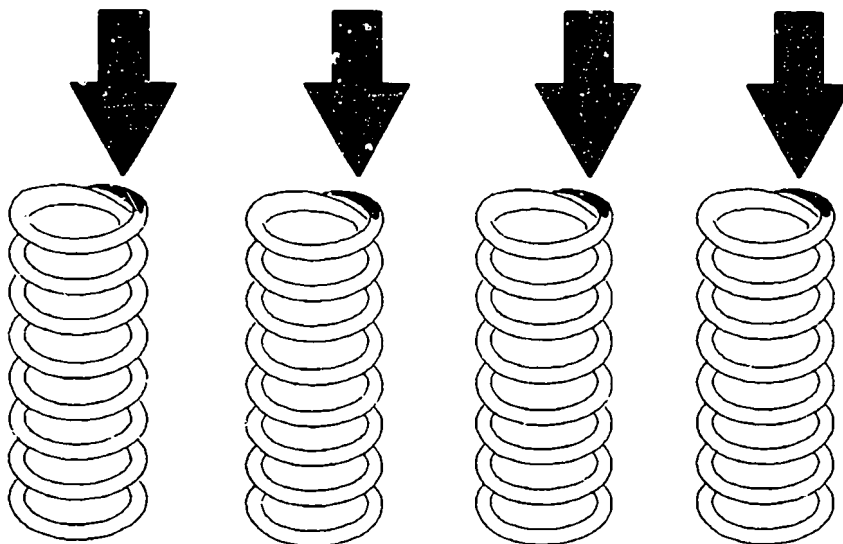
Plunger springs:

Corroded plunger springs or plunger springs which exhibit surface damage are to be replaced on account of the danger of fracture.

Pay particular attention to the area of the 1st winding seat surface (arrows).

Continue: D02/2 Fig.: E06/2

KMK01259



COMPONENT CHECKING AND REPAIR

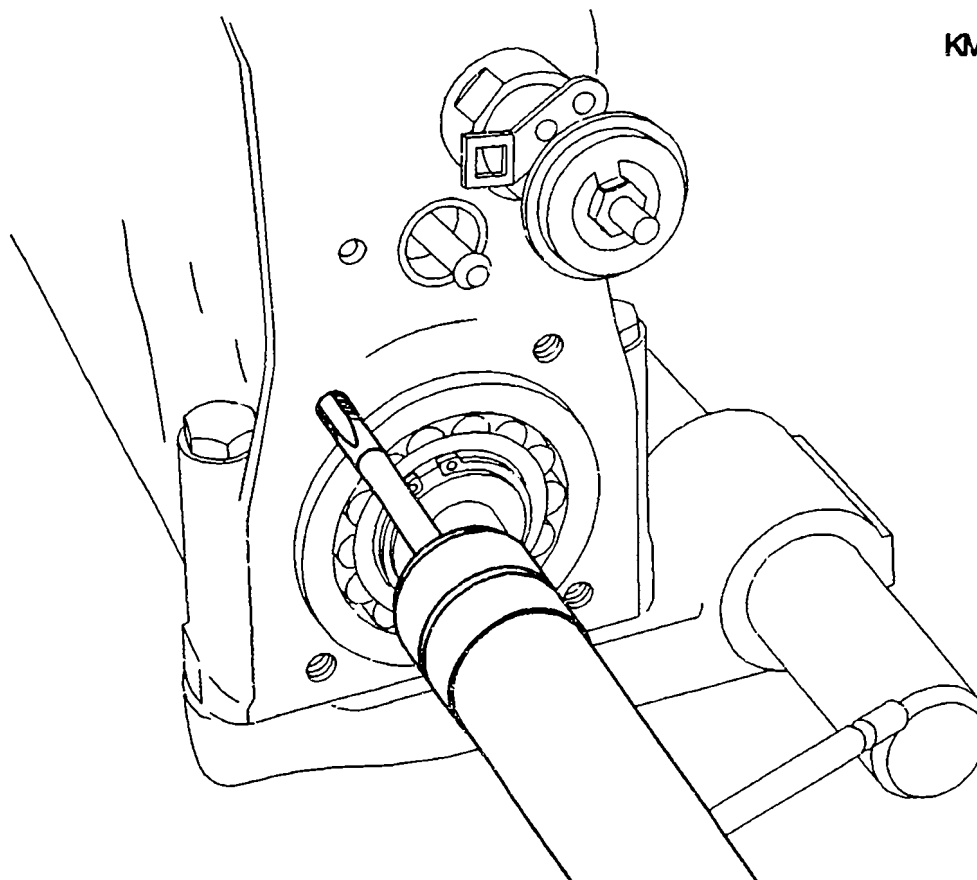
Microencapsulated screws:

Various fastening screws (e.g. camshaft bearing flanges, EHAB) are micro-encapsulated as a means of self-locking. The microencapsulation can become ineffective even after the screw has been removed once, i.e. the screw can be turned too easily.

The following procedure is thus to be adopted:

Clean tapped holes with appropriately sized tap and blow out with compressed air. Holes must be free from dirt and oil residue.

Continue: E08/1 Fig.: E07/2



KMK01036

COMPONENT CHECKING AND REPAIR

Microencapsulated screws:

Also clean screw threads with wire brush.

Note: Even with new screws the micro-encapsulation is to be removed with a wire brush if the screws have been stored for more than one year since the maximum storage period for micro-encapsulated screws is 12 months.

To effect self-locking, the threads of the cleaned screws are to be coated immediately prior to installation with locking compound "Loctite 242".

Continue: E08/2

COMPONENT CHECKING AND REPAIR

Microencapsulated screws:

Note: The procedure described for the treatment of microencapsulated screws and their installation with "Loctite 242" applies in all cases and is not individually repeated in the operations concerned.

Continue: D02/2

COMPONENT CHECKING AND REPAIR

EHAB:

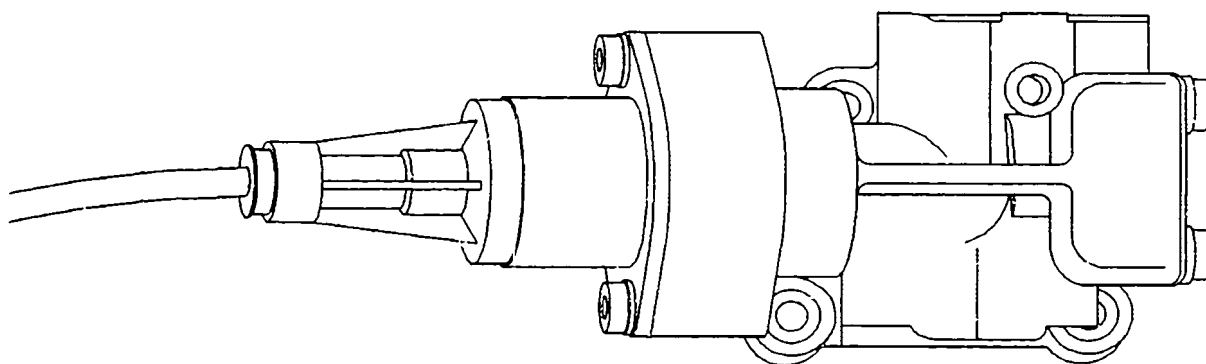
Actual functional testing of the EHAB is part of checking/adjustment of the injection-pump assembly.

The following description deals with electrical testing and replacement of the servo magnet.

Further EHAB repair measures are not envisaged.

Continue: E10/1 Fig.: E09/2

KMK05289



COMPONENT CHECKING AND REPAIR

EHAB:

Electrical testing:

Briefly apply rated voltage (12 V or 24 V - see label) to EHAB. Switching must be audible in the form of a clicking noise.

Resistance measurement at both pins:

Test specification

(approx. 20 Grad C):

12 V: 9.5...12.0 Ohm.

24 V: 36.0...46.0 Ohm.

Replace EHAB if necessary.

Continue: E11/1

COMPONENT CHECKING AND REPAIR

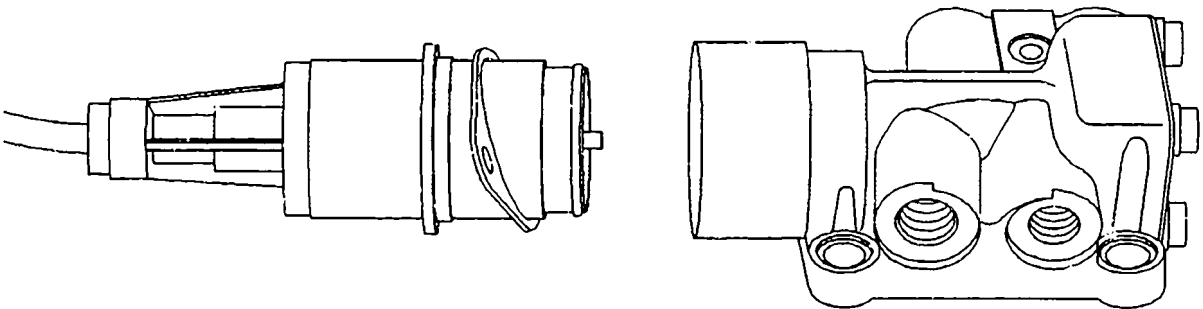
EHAB:

Removing servo magnet:

**Screw out magnet fastening screws
(microencapsulated). Pull magnet with
shim out of EHAB housing.**

Continue: E12/1 Fig.: E11/2

KMK05290



COMPONENT CHECKING AND REPAIR

EHAB:

Servo magnet installation:

Determining shim thickness "S" for new servo magnet:

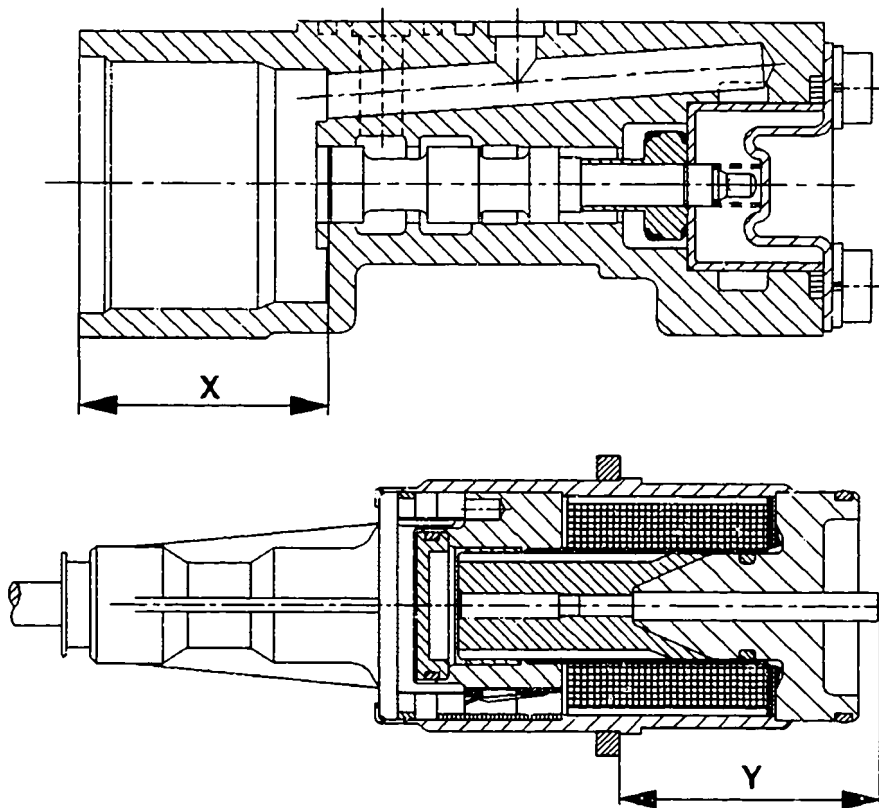
* Measure dimension X in EHAB housing (magnet support - valve spool) with valve spool compressed.

Note: Only compress spring force of valve spool, not internal seal ring. If necessary, use commercially available spring balance and do not exceed maximum force of approx. 35 grams.

Continued on next Coordinate.

Continue: E13/1 Fig.: E12/2

KMK05291



COMPONENT CHECKING AND REPAIR

EHAB:

Servo magnet installation:

Determining shim thickness for new servo magnet (continued):

* Apply rated voltage (12 V or 24 V, see label) to servo magnet. Measure dimension Y (flange - armature).

* Calculate shim thickness in line with the following:

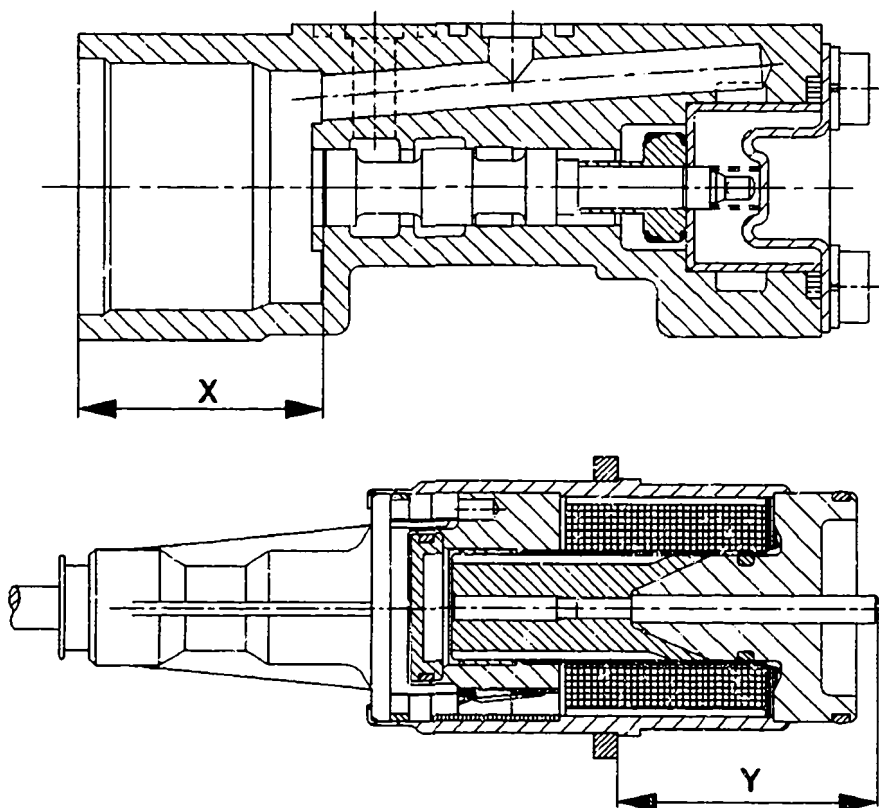
$$S = Y - 0.45(\text{mm}) - X.$$

Fit servo magnet with new seal ring and shim determined.

Screw tightening torque: 7...9 Nm.

Continue: D02/2 Fig.: E13/2

KMK05291



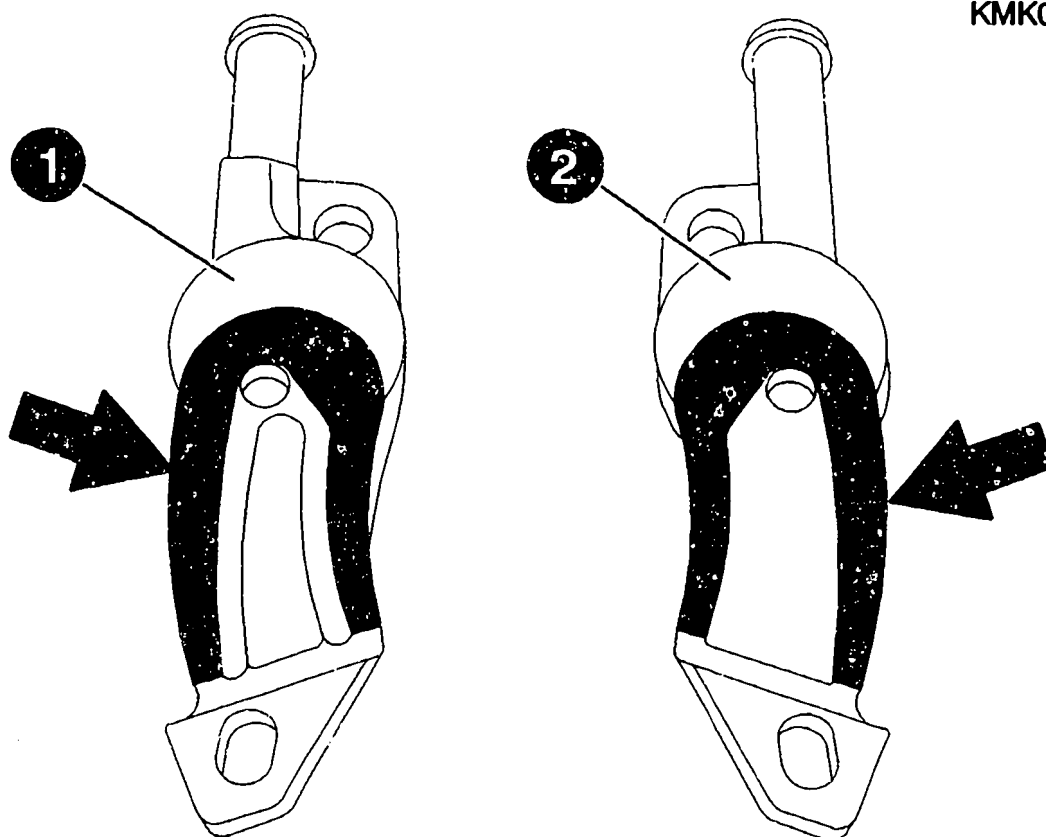
COMPONENT CHECKING AND REPAIR

Oil pump (viscous pump), disk cam:

The oil pump is part of the RE positioner. However as this is disassembled/assembled within the scope of pump repair, component checking is performed here.

Renew oil pump with damaged/scored bearing surface (arrows).

Continue: E15/1 Fig.: E14/2



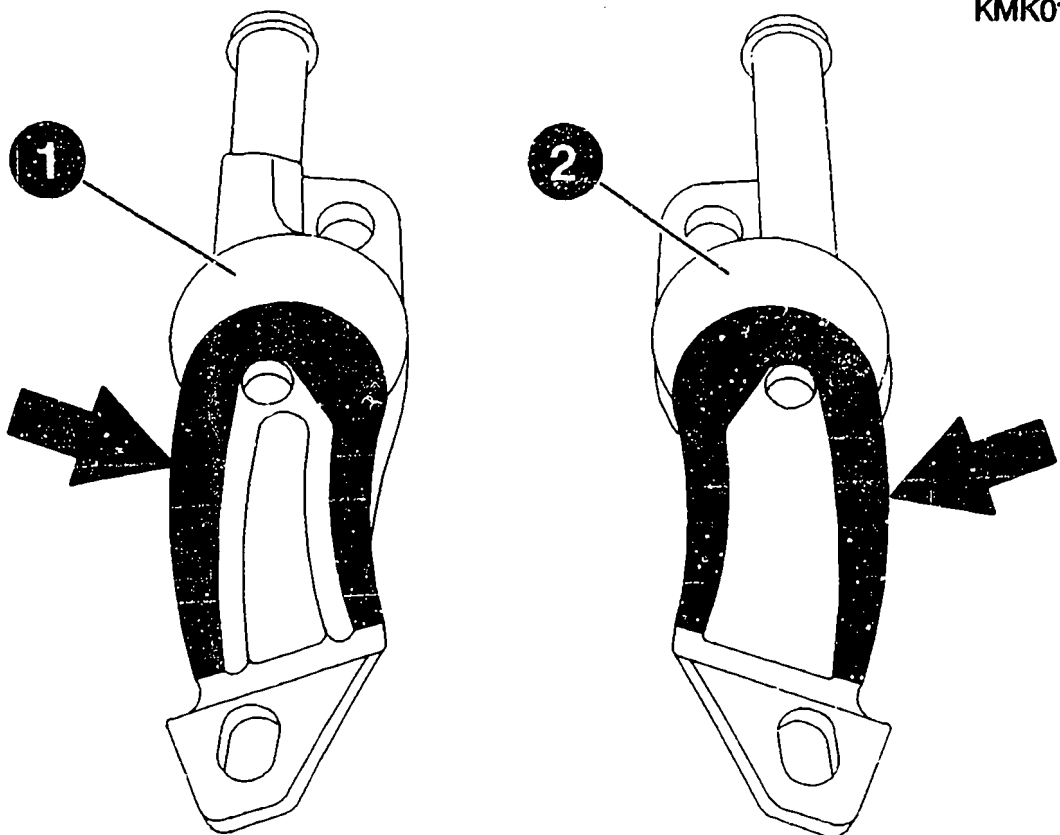
FUEL-INJECTION PUMP ASSEMBLY

Installing oil pump (viscous pump):

Note: Up until approx. mid 1994 oil pumps with different housing curvature were installed depending on the direction of rotation of the injection pump:

For counter-clockwise (fig. 1), mounted on left when viewed from disk cam side; mounted on right for clockwise (fig. 2). The corresponding oil hoses likewise differ.

Continue: E16/1 Fig.: E15/2



FUEL-INJECTION PUMP ASSEMBLY

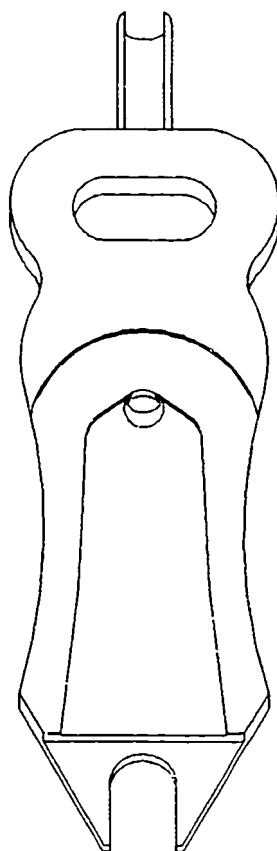
Installing oil pump (viscous pump):

As of approx. mid 1994 there is only one standard oil pump which is independent of direction of rotation. The correct installation side in line with the notes on the previous Coordinate is however still to be heeded.

The new version can also be installed in place of the direction-dependent version.

Continue: E17/1 Fig.: E16/2

KMK05292



COMPONENT CHECKING AND REPAIR

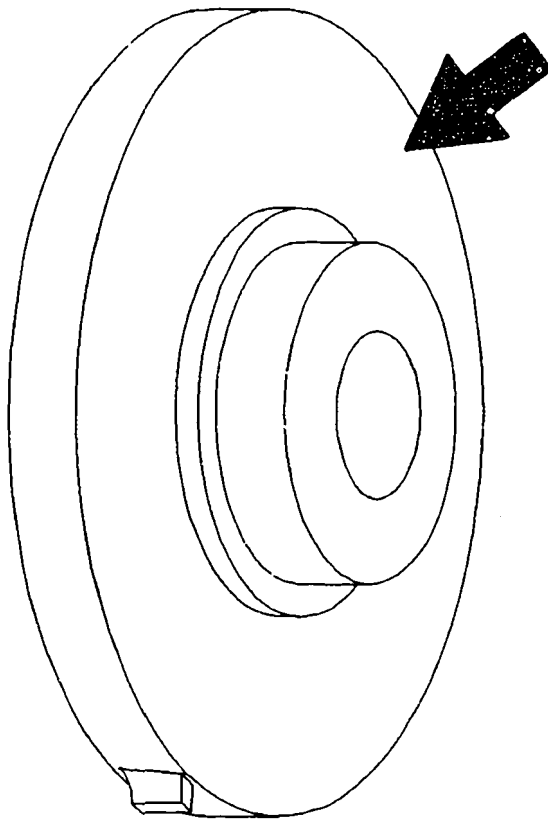
Oil pump (viscous pump), disk cam:

The ground bearing surface for the oil pump on the back of the disk cam (arrow) must not be damaged or scored.

Replace disk cam if necessary.

Note: Functional testing of the oil pump is performed within the framework of checking/adjustment of the injection-pump assembly.

Continue: N27/2 Fig.: E17/2



KMK05293

FUEL-INJECTION PUMP ASSEMBLY

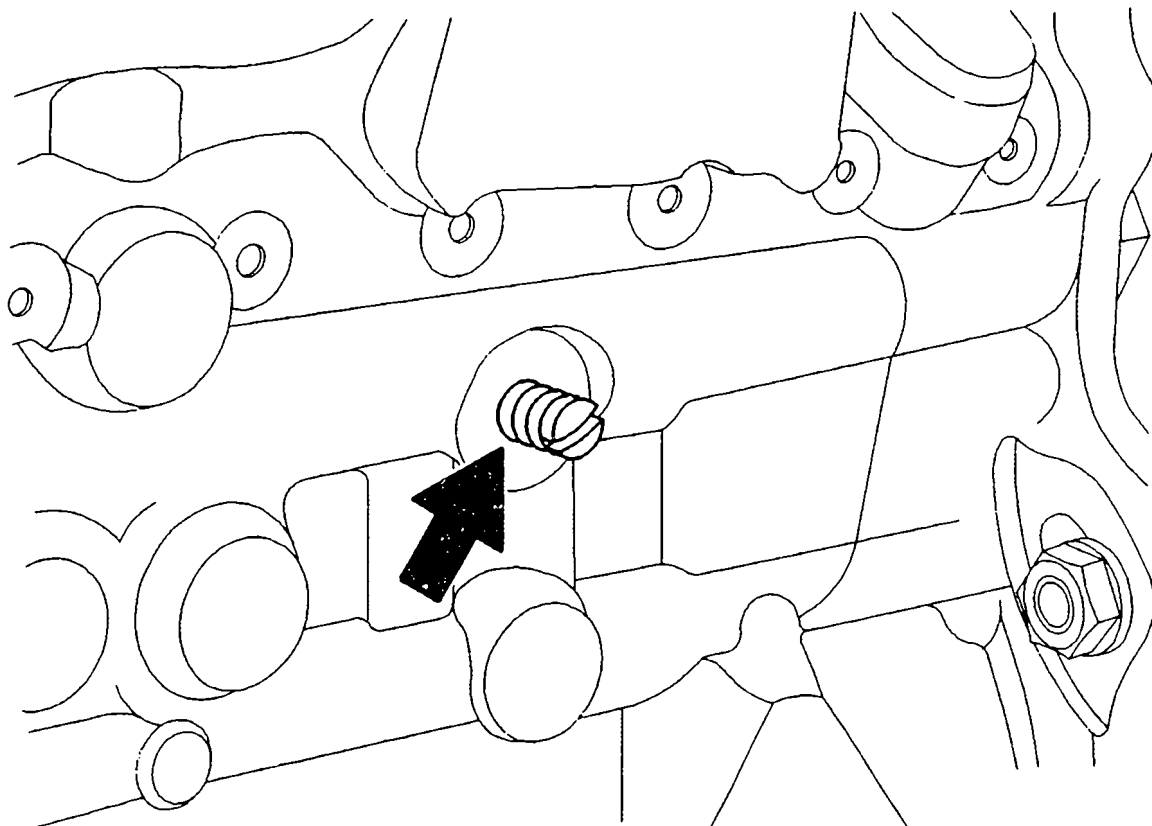
Re-install pump housing on swivel-type clamping support.

Installing quantity control rod: Screw in control-rod guide screw (thread reel guide) to projection dimension established on removal.

Note: Keep to sequence.
Guide screw cannot be inserted after control rod has been installed.

Continue: F02/1 Fig.: F01/2

KMK05294



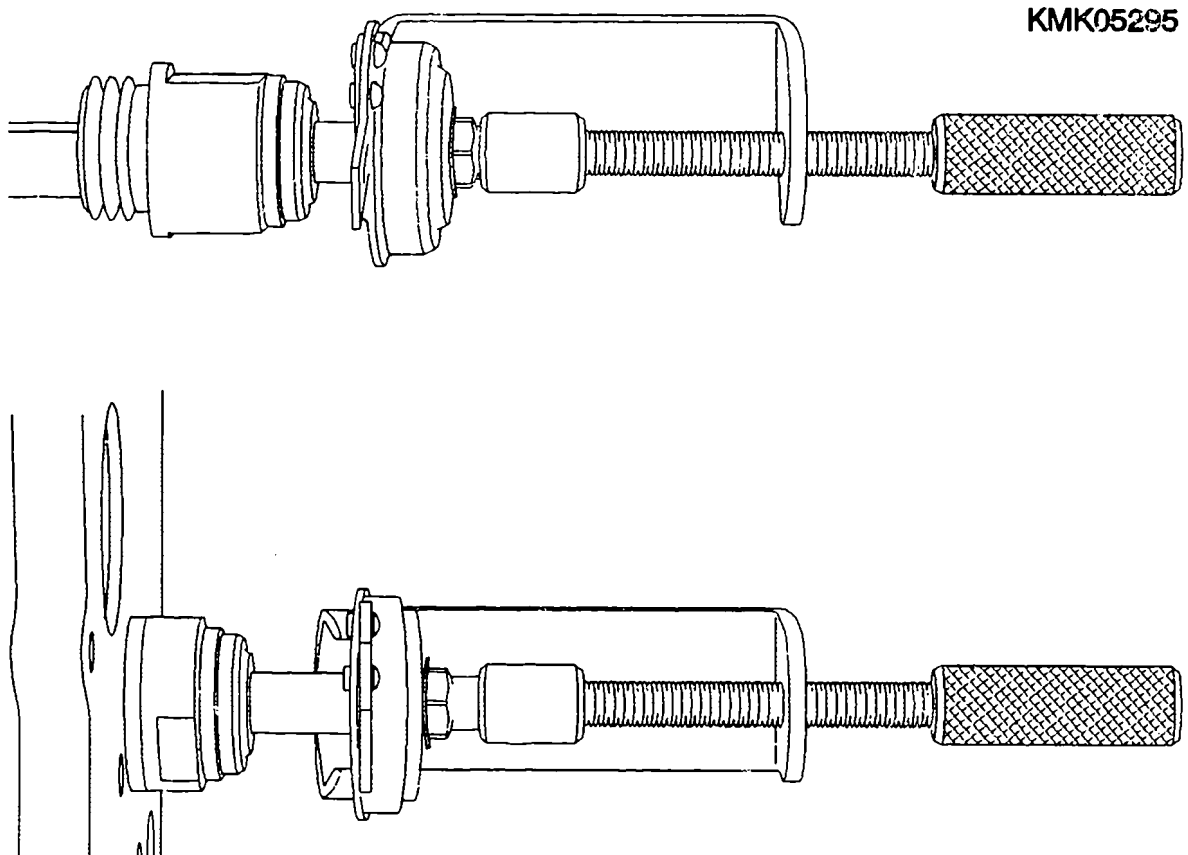
FUEL-INJECTION PUMP ASSEMBLY

Installing quantity control rod:

Before installing control rod, pre-tension return spring almost to the limit with spring tensioner
0 986 612 311.

Insert control rod on governor end and guide into drive-end guide bushing. Screw in governor-end bushing and tighten to a torque of 30...40 Nm. The spring tensioner remains in position so as to be able to keep a constant check on the freedom of movement of the control rod during subsequent assembly.

Continue: F03/1 Fig.: F02/2



FUEL-INJECTION PUMP ASSEMBLY

Adjusting control-rod guide screw
(thread reel guide):

Screw in guide screw by hand until
contact is made with control rod at
point A.

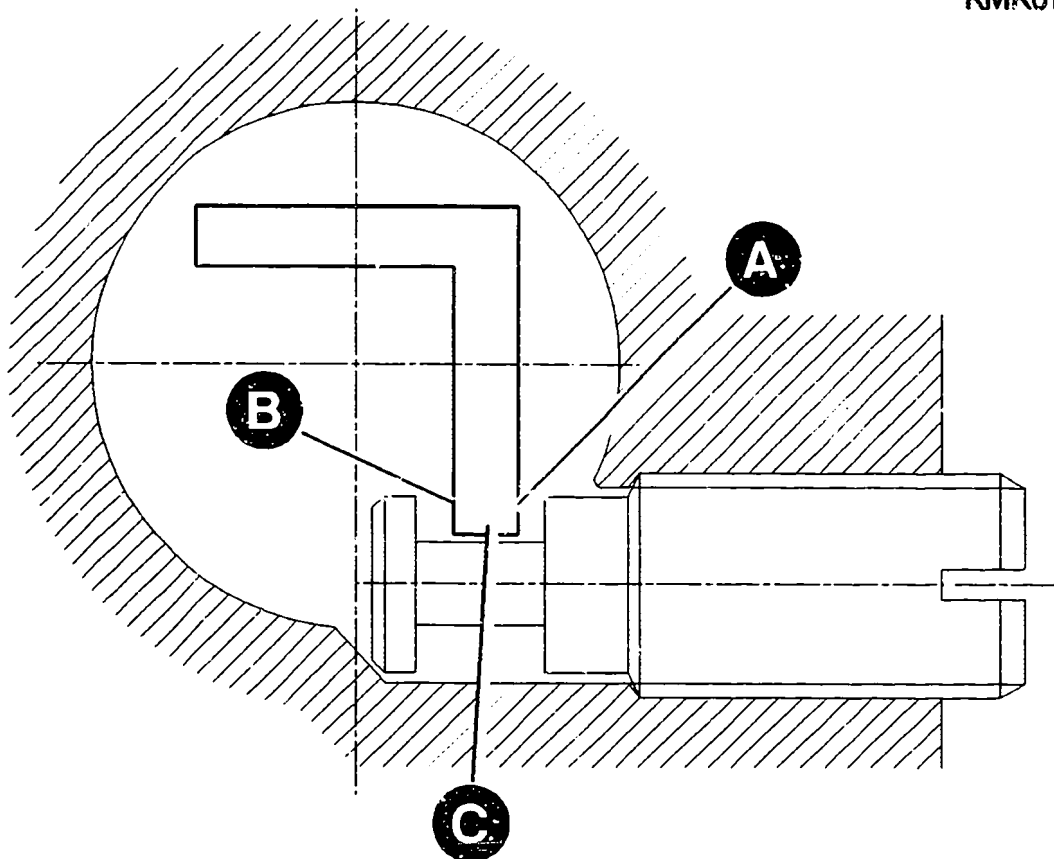
Screw out guide screw as far as
contact point B.

Screw guide screw back in again by
half the distance screwed back
(point C).

Tighten lock nut and cap nut of
control-rod guide screw.

Continue: F04/1 Fig.: F03/2

KMK01282



FUEL-INJECTION PUMP ASSEMBLY

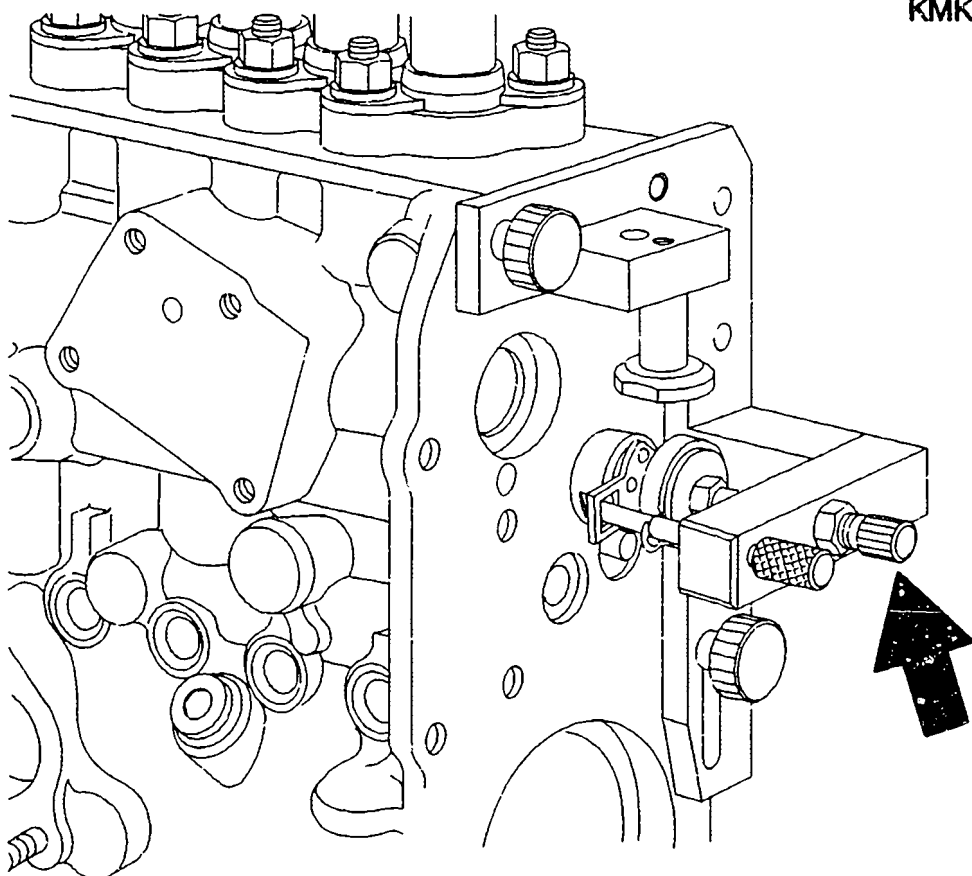
Checking position of RPS short-circuiting ring:

Prior to further assembly check position of RPS short-circuiting ring with setting device 0 986 612 620:

Support setting device at positioning pin on top right of pump housing and secure in appropriate tapped holes in housing using the two knurled screws. Set control rod with adjusting screw (arrow) to roughly half CRT (estimate).

Continue: F05/1 Fig.: F04/2

KMK05296



FUEL-INJECTION PUMP ASSEMBLY

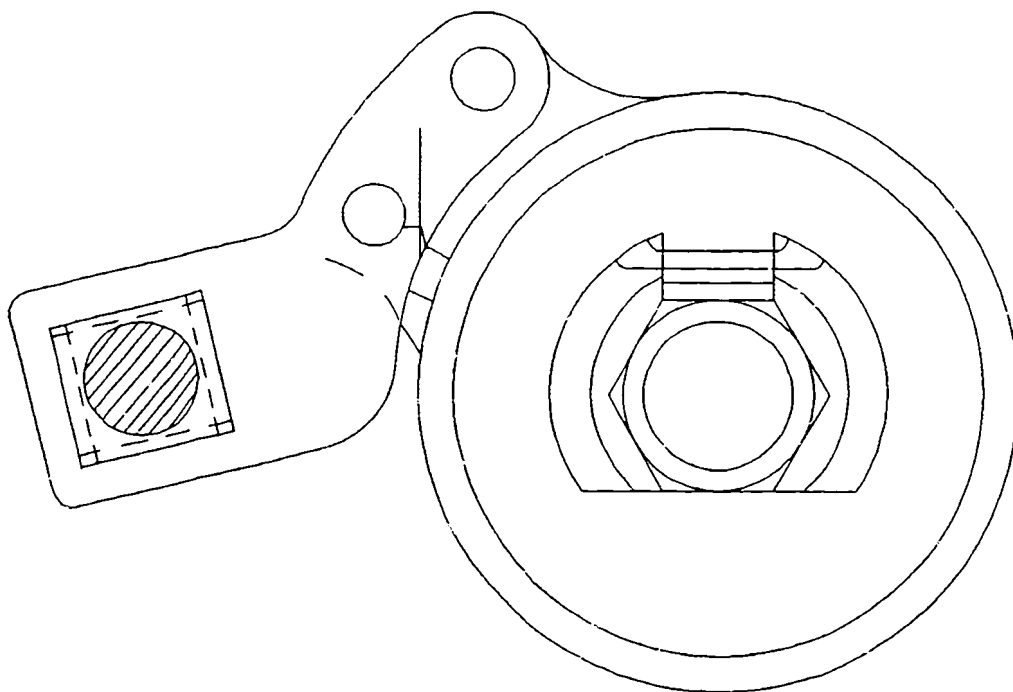
Checking position of RPS short-circuiting ring:

It must be possible to insert measuring rod of tool without resistance in short-circuiting ring. This must likewise be the case if the control rod is turned and released again.

If position of short-circuiting ring does not coincide with that of setting device, control rod is to be replaced (complete unit).

Continue: F06/1 Fig.: F05/1

KMK05249



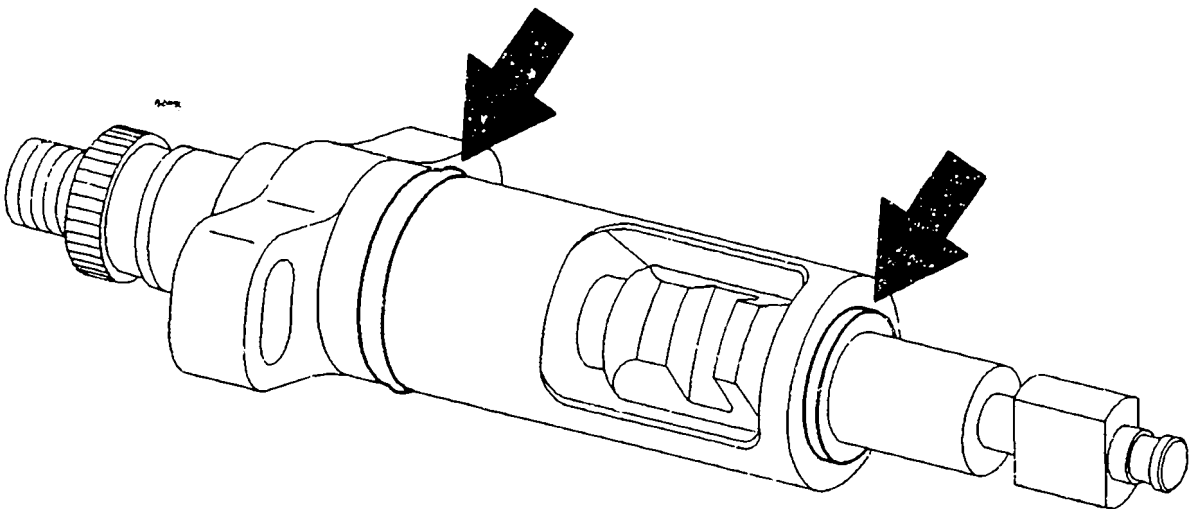
FUEL-INJECTION PUMP ASSEMBLY

Installing barrel-and-valve assemblies:

Immerse assembly plunger, control lever and assembly cylinder in calibrating oil. Carefully insert plunger into cylinder and control lever (bevel at top). Fit square seal ring for assembly seat and O-ring for cylinder stem after applying tallow (arrows).

Continue: F07/1 Fig.: F06/2

KMK05297



FUEL-INJECTION PUMP ASSEMBLY

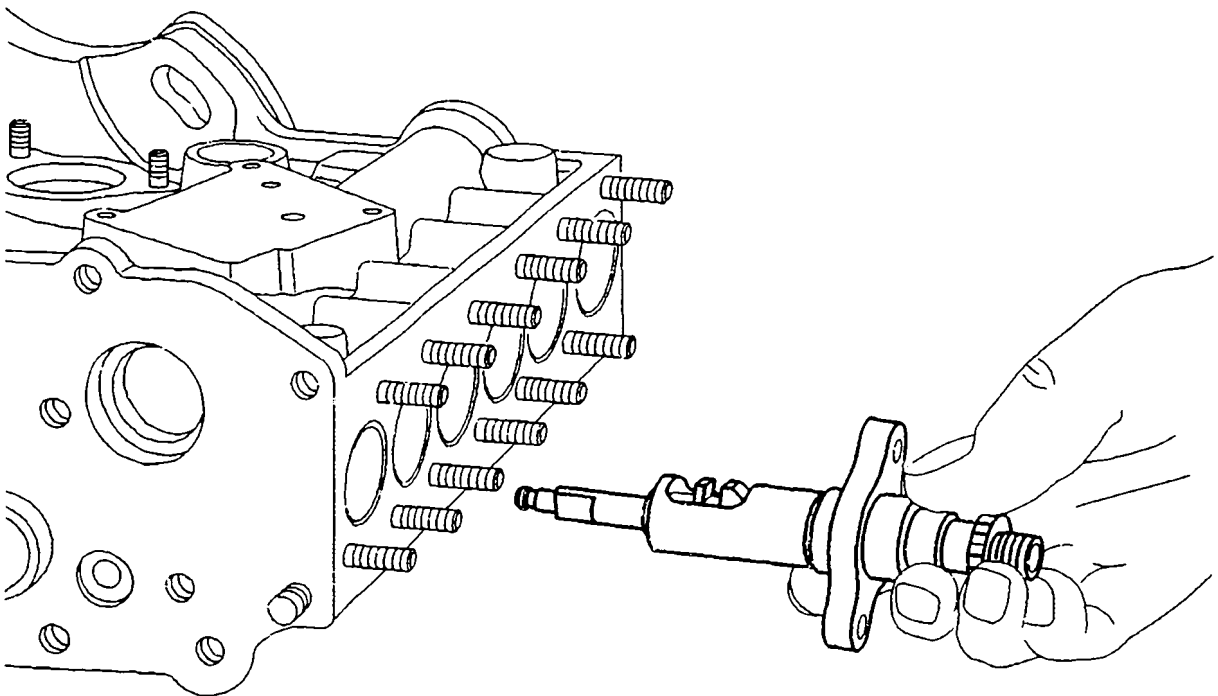
Installing barrel-and-valve assemblies:

Pump horizontal - back of pump (control rod side) at bottom.

Insert complete barrel-and-valve assemblies such that control lever window with control lever faces upwards, i.e. in direction of prestroke shaft bore.

Continue: F08/1 Fig.: F07/2

KMK05298



FUEL-INJECTION PUMP ASSEMBLY

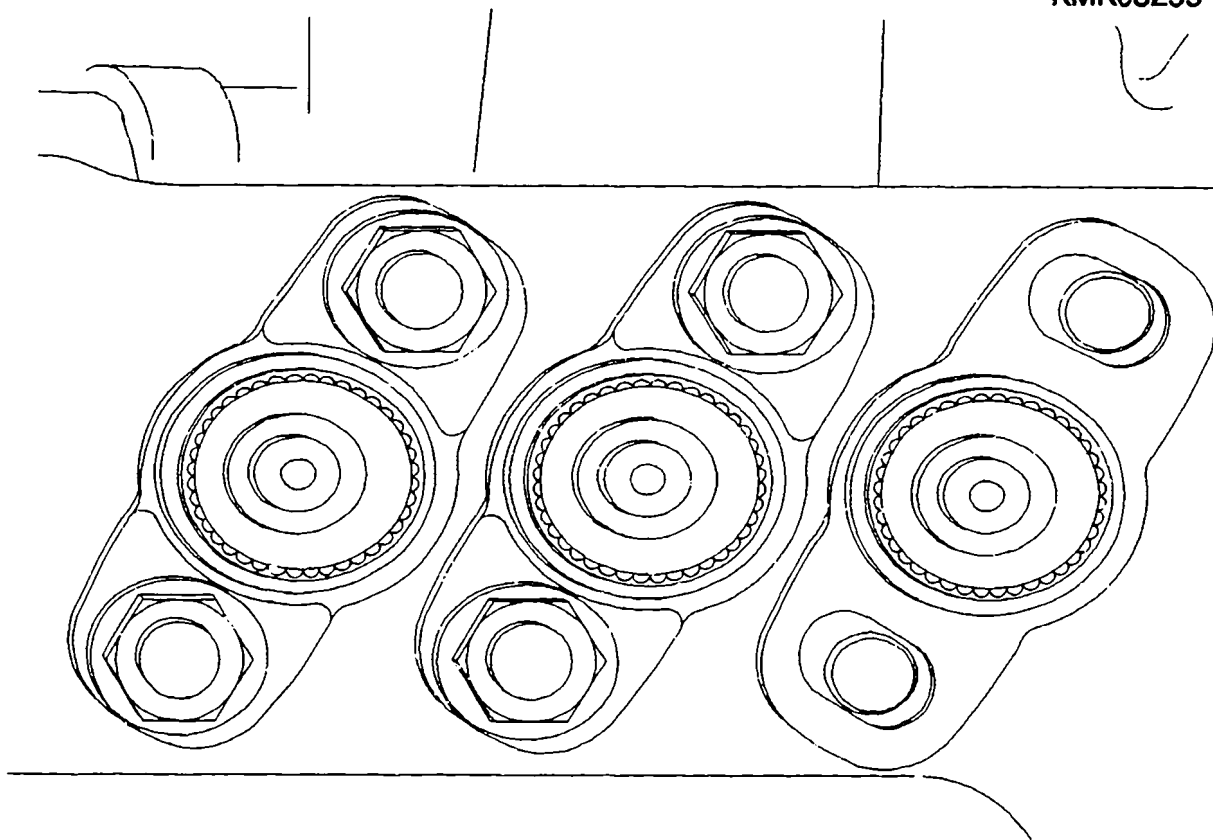
Installing barrel-and-valve assemblies:

Press in assemblies by hand as far as they will go (do not force) and turn such that stay bolts are centered with slots.

Fit shaped washers and nuts and tighten slightly.

Continue: F09/1 Fig.: F08/2

KMK05299

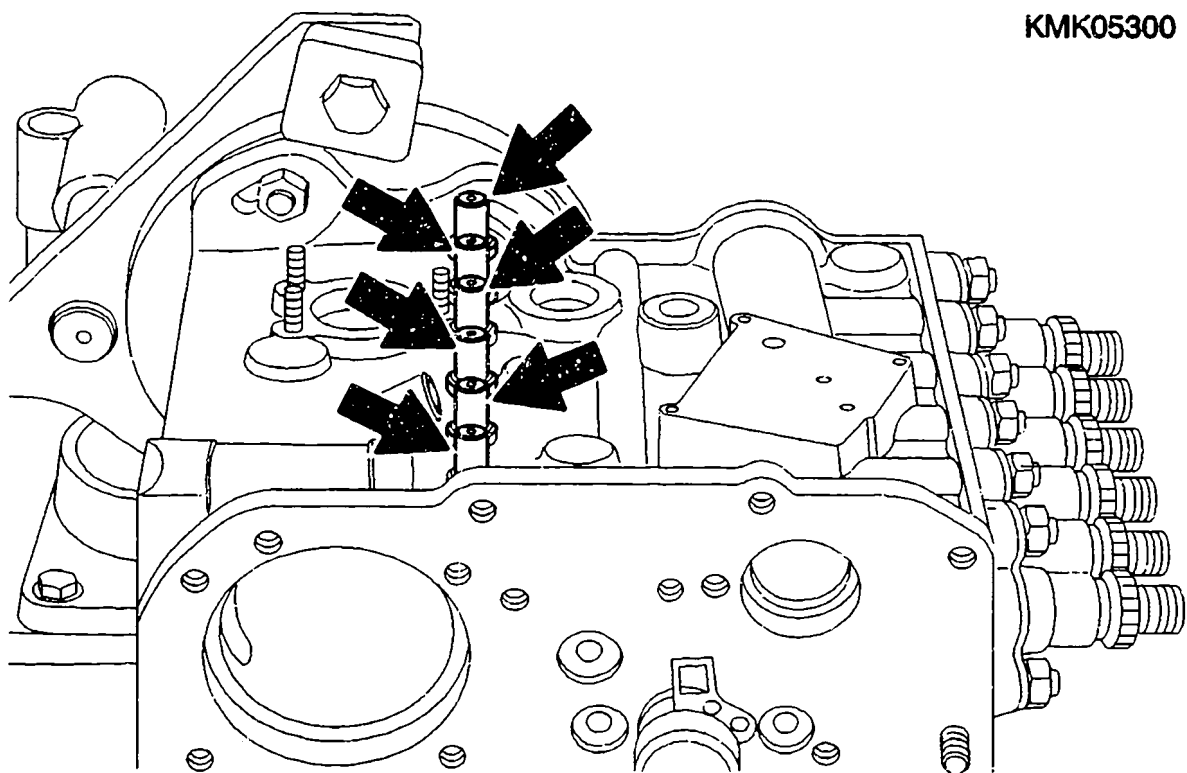


FUEL-INJECTION PUMP ASSEMBLY

Installing barrel-and-valve assemblies:

Insert retaining pins 0 986 612 114 as far as they will go in roller-tappet retention holes (arrows) to stop assembly plungers falling out.

Continue: F10/1 Fig.: F09/2



FUEL-INJECTION PUMP ASSEMBLY

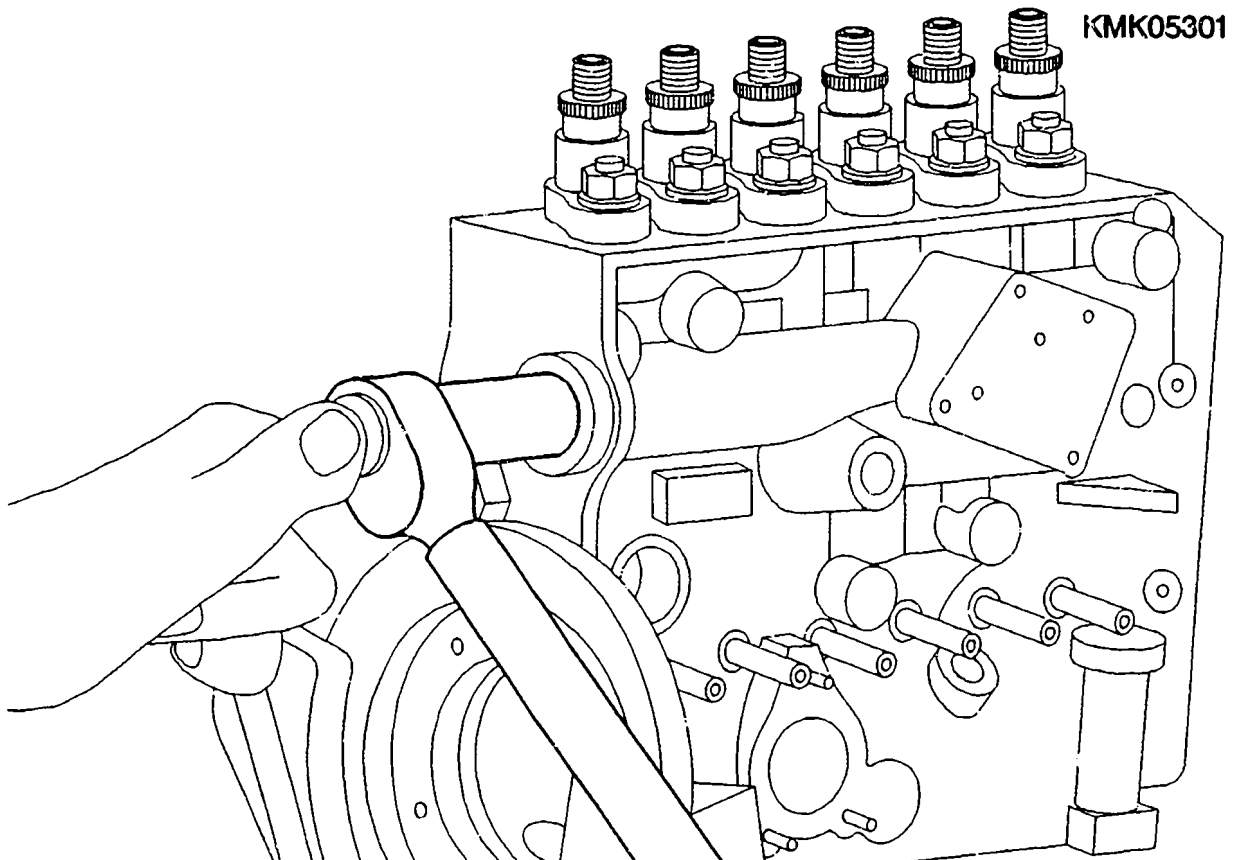
Installing prestroke shaft:

Position injection pump vertically so that all control levers in plunger-and-barrel assemblies slide to lower stop.

Insert drive-end prestroke shaft bearing with new seal ring (coat with tallow).

Screw in threaded ring (thread cleaned and coated with Loctite 242) and secure with assembly wrench 0 986 612 643 to tightening torque of 30...40 Nm.

Continue: F11/1 Fig.: F10/2



FUEL-INJECTION PUMP ASSEMBLY

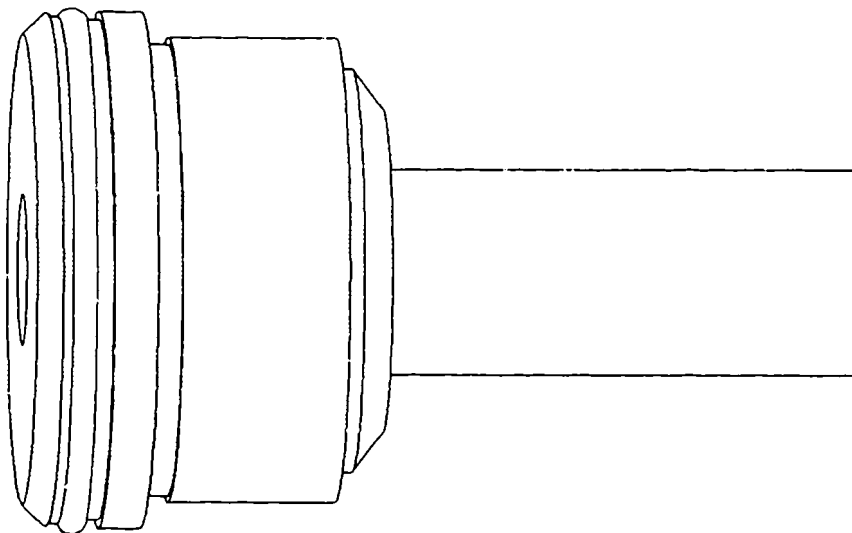
Installing prestroke shaft:

Apply tallow to new O-ring of governor-end prestroke shaft bearing.

Slightly lubricate assembly sleeve 0 986 612 639 to protect internal seal ring and insert into prestroke shaft bearing as far as it will go.

Continue: F12/1 Fig.: F11/2

KMK05302



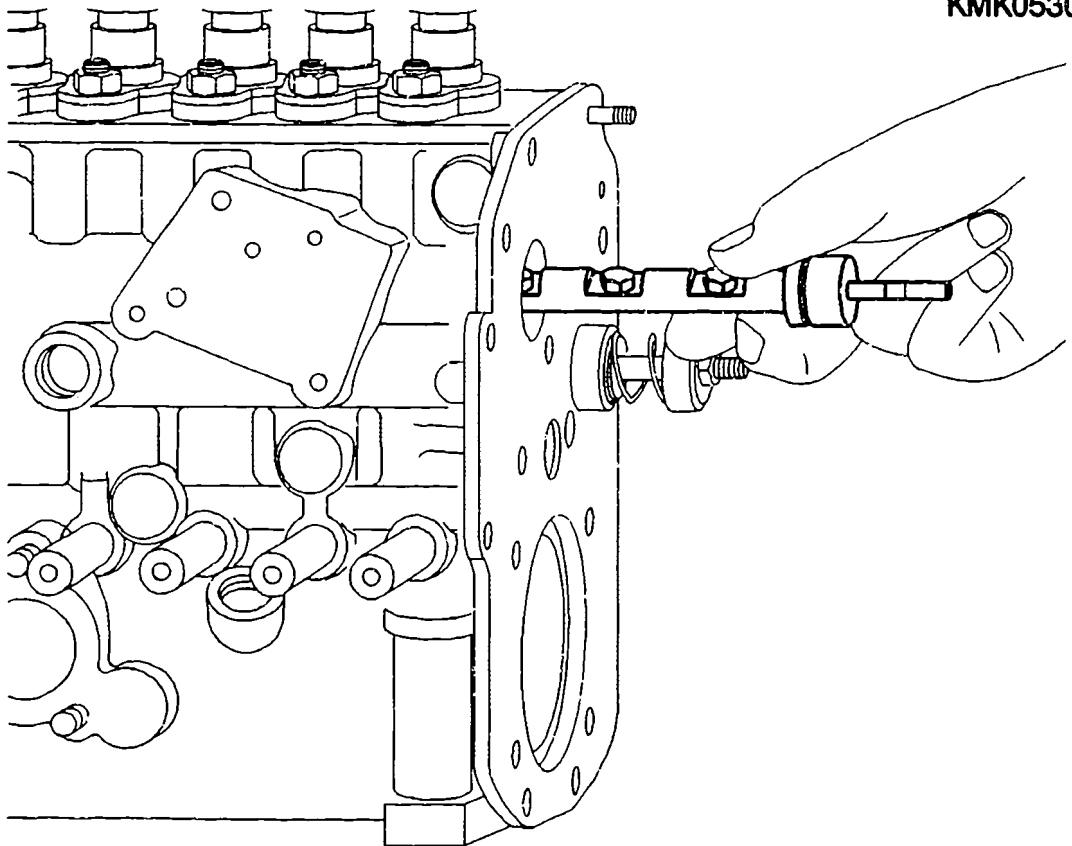
FUEL-INJECTION PUMP ASSEMBLY

Installing prestroke shaft:

Attach prestroke shaft bearing with assembly sleeve to prestroke shaft and insert complete unit into pump. Proceed carefully; do not exert force. Driver ball heads must engage in driver groove of control levers; shaft must be inserted into drive-end bearing.

Press bearing into mount in pump housing as far as it will go.

Continue: F13/1 Fig.: F12/2



FUEL-INJECTION PUMP ASSEMBLY

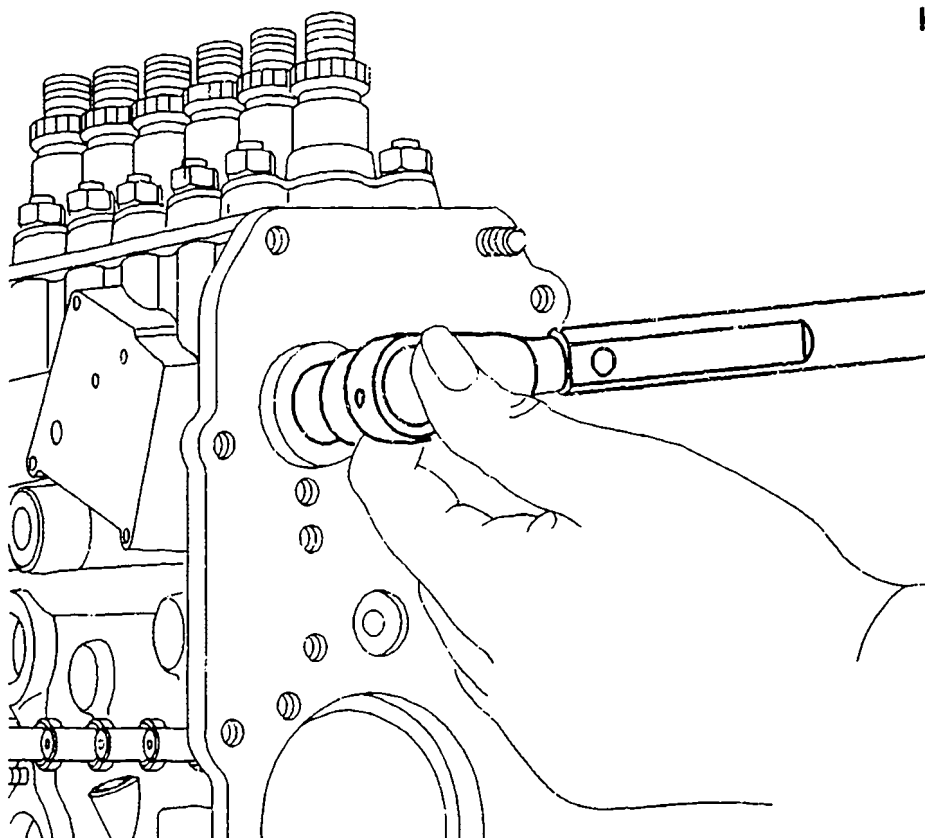
Installing prestroke shaft:

Screw in threaded ring for prestroke shaft bearing (thread cleaned but no Loctite applied) and provisionally tighten with assembly wrench

0 986 612 643 to approx. 20 Nm.

Note: As there is every likelihood that the prestroke shaft will have to be removed again during subsequent checking and adjustment, there is no point applying Loctite 242 or the full tightening torque. The mechanic performing the check should however be made aware of the above if necessary by way of a sign.

Continue: F14/1 Fig.: F13/2



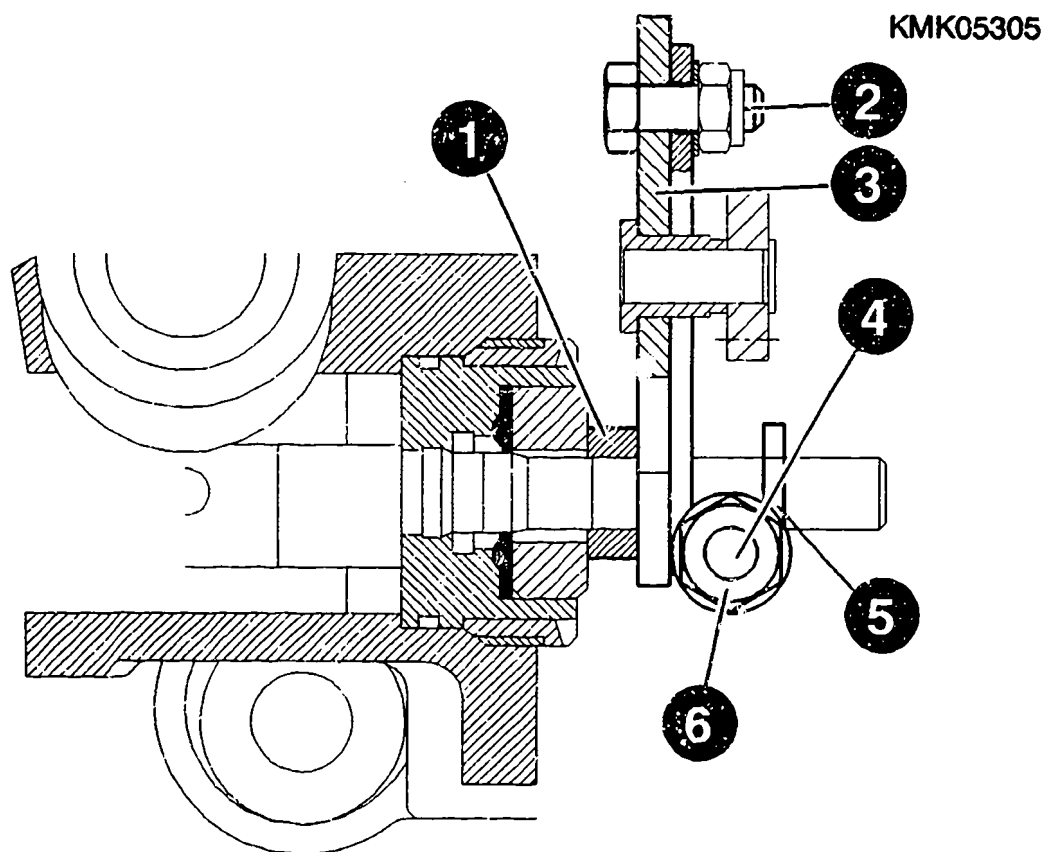
KMK05304

FUEL-INJECTION PUMP ASSEMBLY

Installing control lever - prestroke shaft:

Fit washer (1). Loosen correction screw (2) at two-piece control lever and slip loose lever (3) first onto shaft. If stiff, loose lever may have to be straddled somewhat. Turn lever such that wedge screw (4) can be inserted from underneath in clamping bracket (5). Place washer and new self-locking nut (6) in position and fasten loosely.

Continue: F15/1 Fig.: F04/2



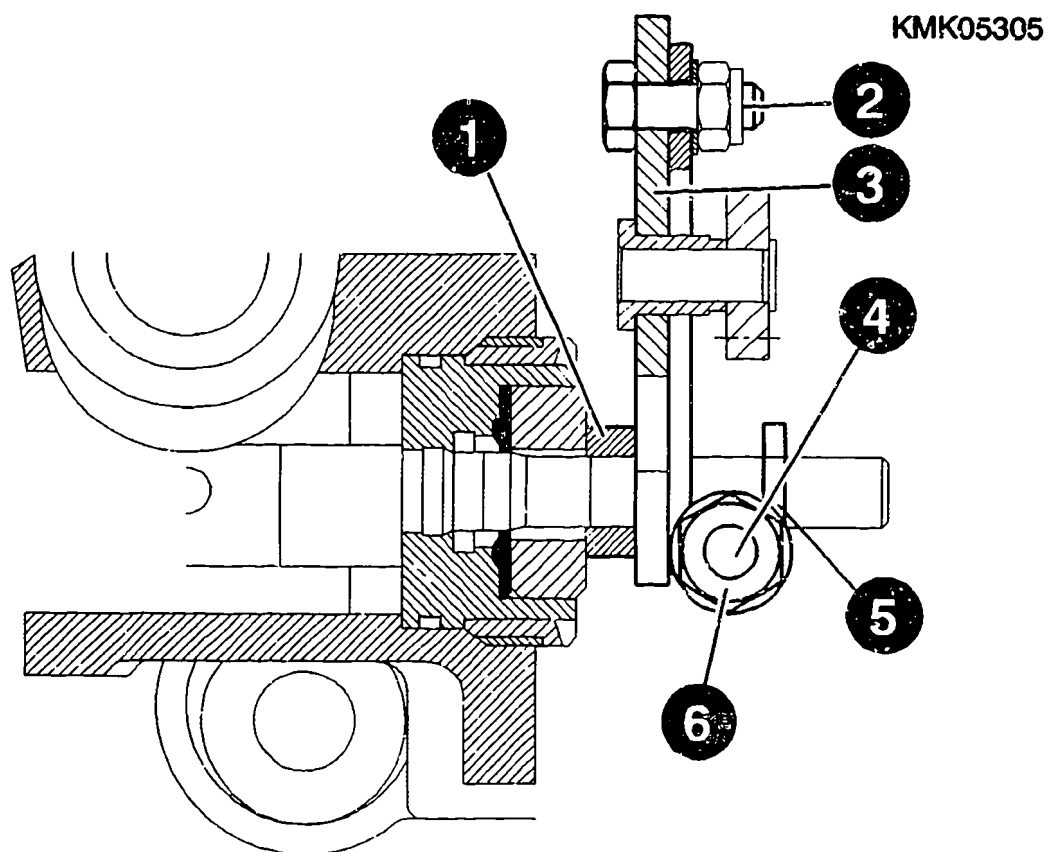
FUEL-INJECTION PUMP ASSEMBLY

Installing control lever - prestroke shaft, adjusting prestroke-shaft axial clearance:

Axial-clearance set value:
0.10...0.15 mm.

Pull prestroke shaft outwards as far as it will go and simultaneously push control lever against washer so that prescribed clearance is maintained. Check with feeler gauge between loose lever (3) and washer (1). 0.10 mm gauge must be easy to insert, 0.15 mm gauge difficult. Tighten nut (6) to torque of 6...7 Nm.

Continue: F16/1 Fig.: F15/2



FUEL-INJECTION PUMP ASSEMBLY

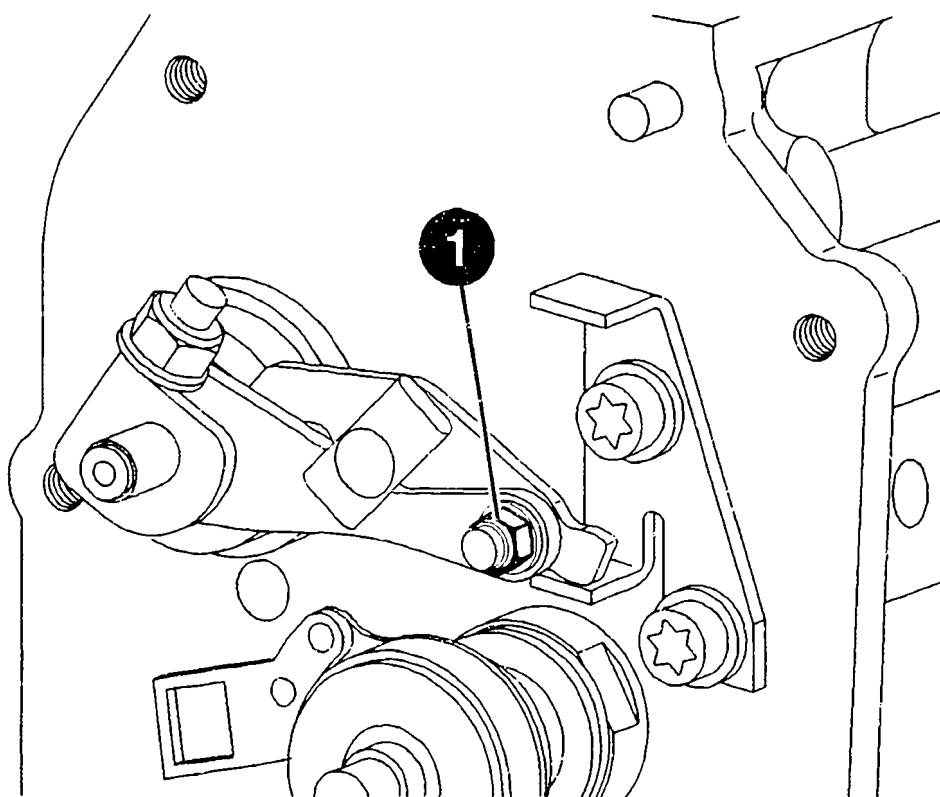
Installing control lever - prestroke shaft:

After adjusting axial clearance, slightly tighten lever correction screw (1) at upper end of slot.

Screw on control-lever stop bracket such that it is centered with slots of both screws.

Note: The procedure described must be repeated when checking/adjusting the pump and is described again in the test instructions.

Continue: F17/1 Fig.: F16/2



KMK05306

FUEL-INJECTION PUMP ASSEMBLY

Checking prestroke shaft for freedom of movement:

Raise control lever as far as upper stop and release. Lever must automatically drop to lower stop (drop test).

This test provides information as to the freedom of movement of shaft bearing and control lever.

Continue: F18/1

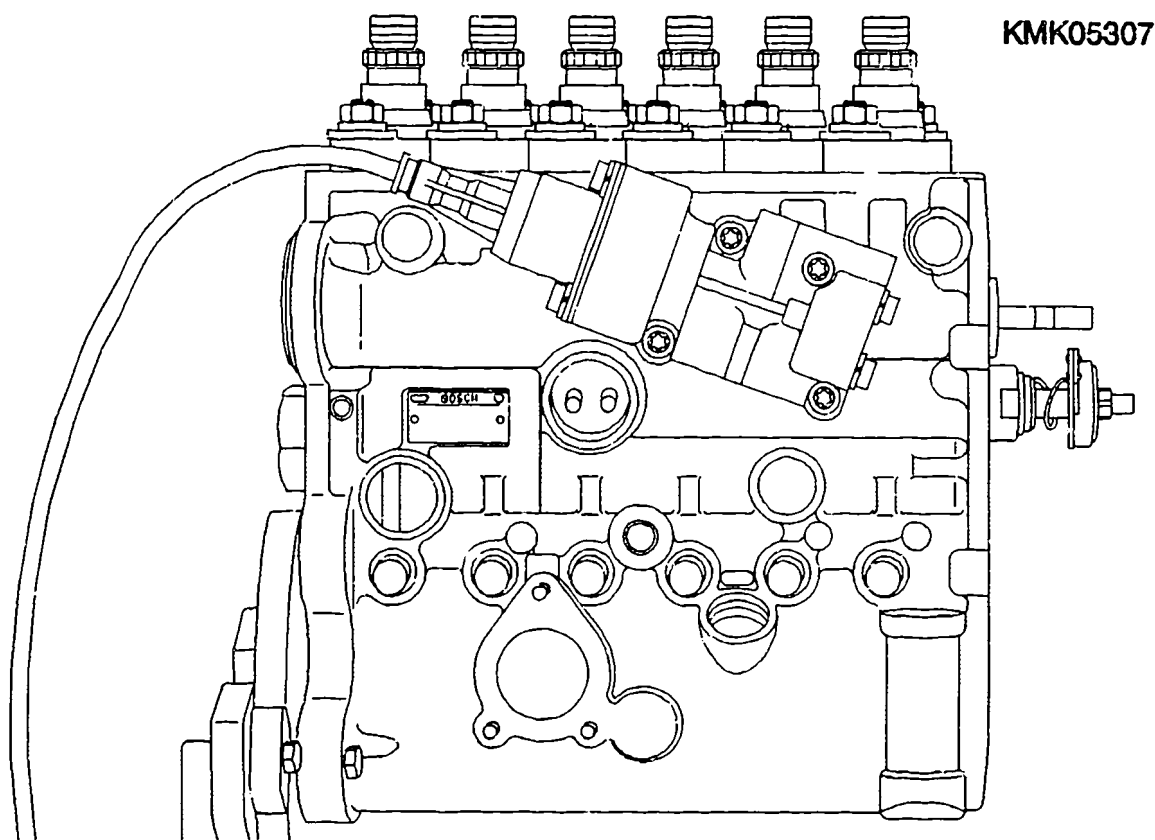
FUEL-INJECTION PUMP ASSEMBLY

Suction-gallery leak test:

Attach EHAB/ELAB with new seal rings to pump. Screw fuel temperature sensor into connecting hole. Use screw plugs to seal all connections on EHAB/ELAB with the exception of the return connection.

Remove pump from assembly frame. Make sure that retaining pins in roller-tappet retention holes do not drop out.

Continue: F19/1 Fig.: F18/2



FUEL-INJECTION PUMP ASSEMBLY

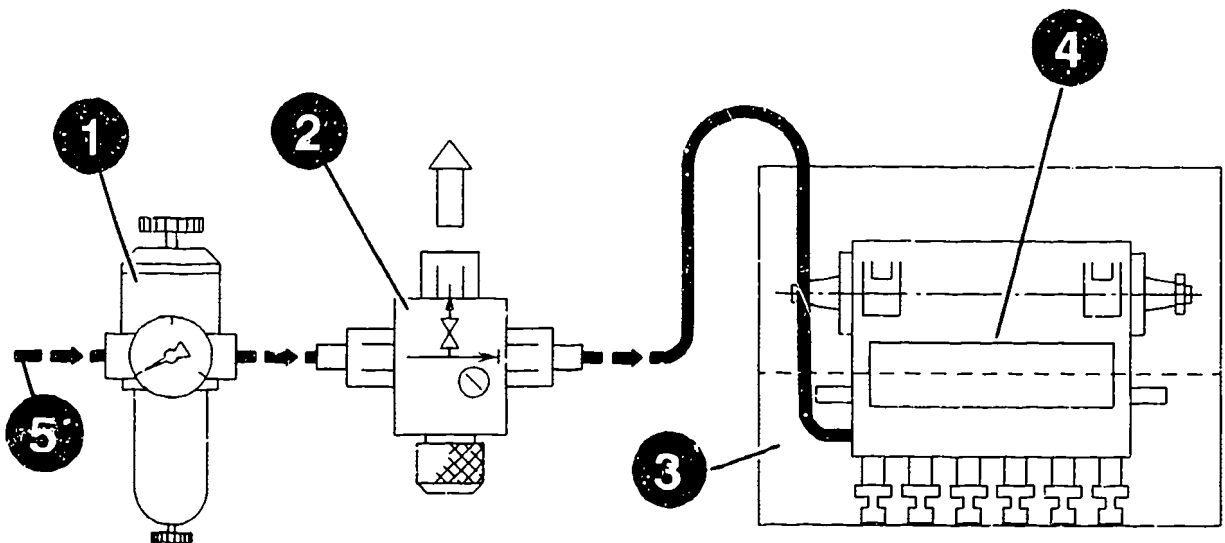
Suction-gallery leak test:

Connect pump via pressure reducing valve with water trap and Jetronic directional control valve to compressed-air network. Compressed-air connection to suction gallery at return connection of EHAB/ELAB (without overflow valve).

- 1 = Pressure reducing valve with pressure gauge 0...6 bar and water trap
- 2 = Jetronic directional control valve 0 986 615 111 (KDJE-P 100/1.1)
- 3 = Calibrating oil bath
- 4 = Injection pump
- 5 = Direction of compressed-air flow

Continue: F20/1 Fig.: F19/2

KMK05308



FUEL-INJECTION PUMP ASSEMBLY

Suction-gallery leak test:

Note: To avoid possible skin irritation, apply hand cream before performing the following test and wash hands in soap and water on completion. It is also appropriate to wear rubber gloves.

Continue: F21/1

FUEL-INJECTION PUMP ASSEMBLY

Suction-gallery leak test:

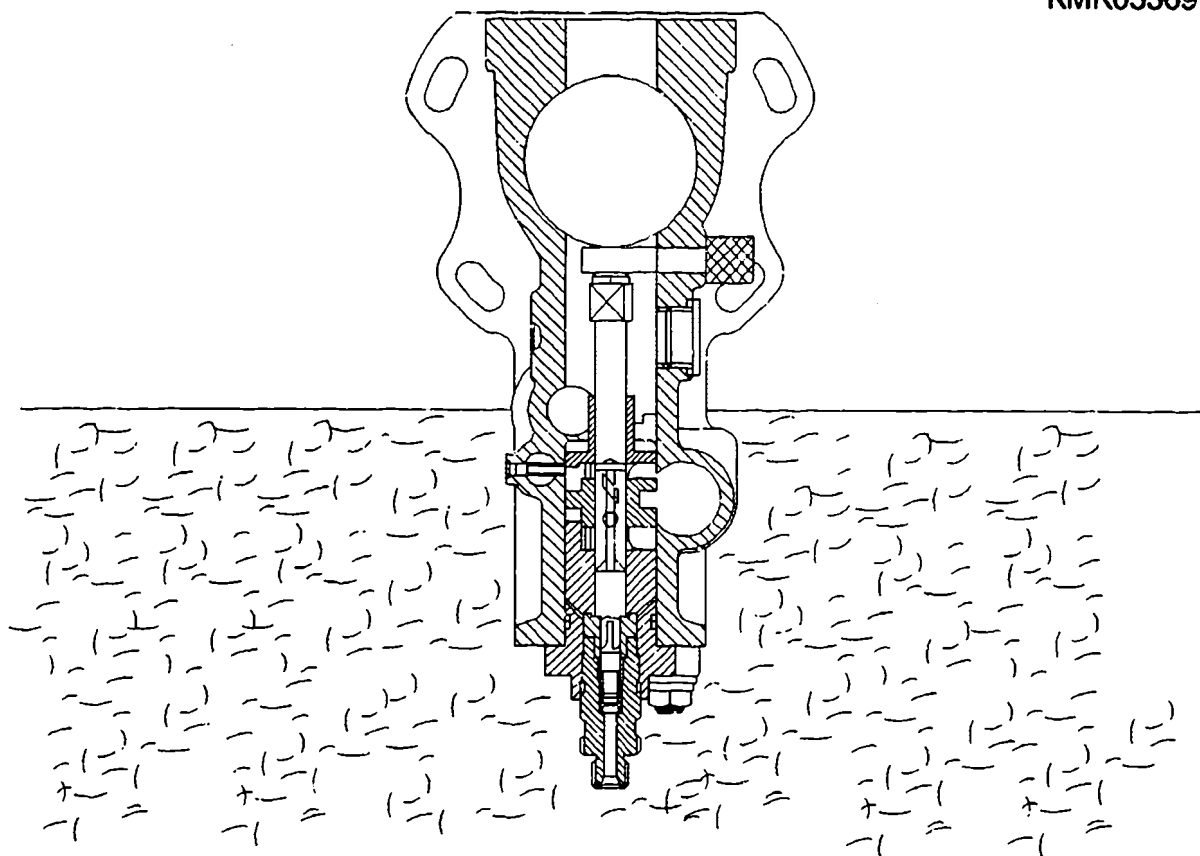
Position pump in bath with openings in bottom facing upwards. Refer to fig. for calibrating oil level.

Only swivel pump to localize possible leakage.

Test period: 7 minutes pulsating 0...5 bar. Pulsation by opening and closing valve. Leakages (bubbles) in the area of the suction gallery are not permitted. Pay particular attention to freedom from leaks of assembly seats. Slight leakage between assembly cylinder and plunger is an exception.

Continue: F22/1 Fig.: F21/2

KMK05309



FUEL-INJECTION PUMP ASSEMBLY

Suction-gallery leak test:

The cause of any impermissible leakage is to be sought and eliminated. Possible causes are seal rings cut on assembly, damaged assembly seats or the like.

After performing leak test, remove pump from bath and dry it off. Always make sure that retaining pins do not drop out of roller-tappet retention holes.

Re-install pump on assembly frame.

Continue: F23/1

FUEL-INJECTION PUMP ASSEMBLY

Installing control sleeves:

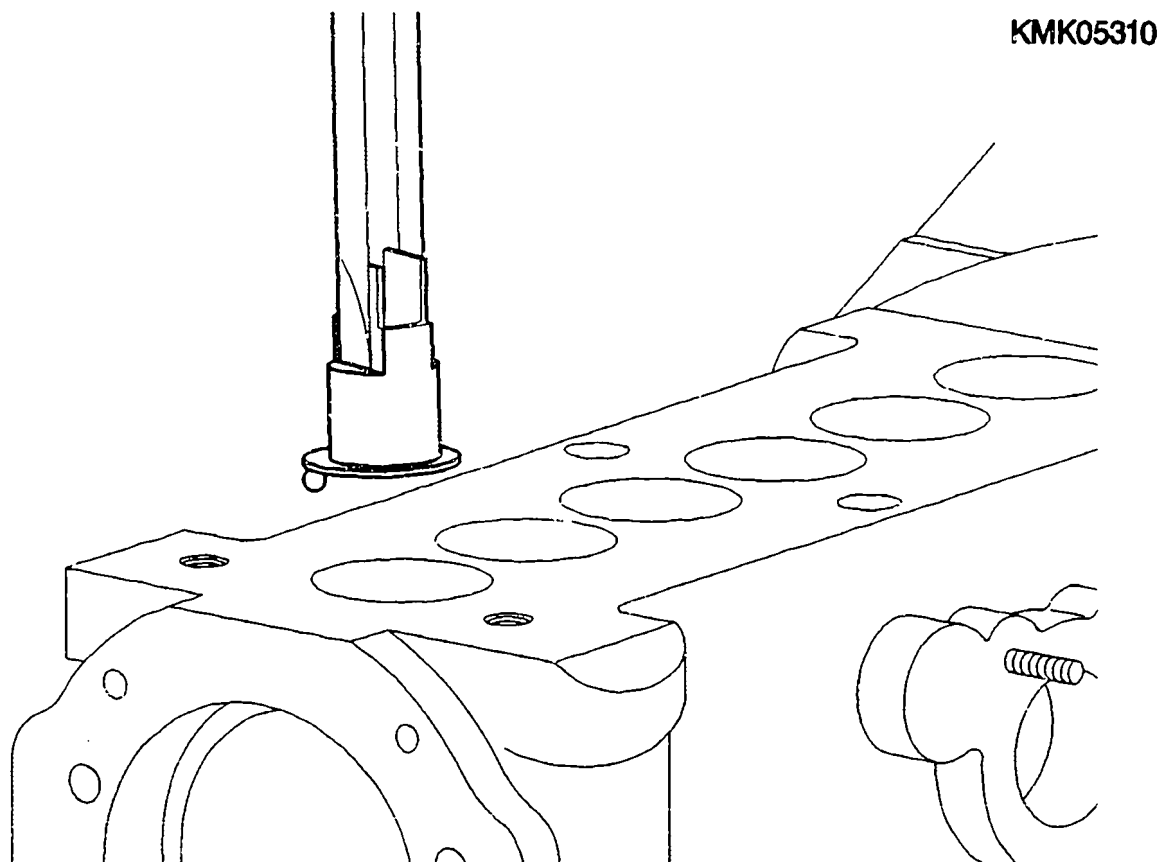
Remove EHAB/ELAB from pump again.
Swivel pump downwards (holes in
bottom facing upwards).

Remove retaining pins.

Move control rod into center position,
such that control-rod driver slots
coincide with roller-tappet guides.

Use large tweezers or the like to
insert control sleeves.

Continue: F24/1 Fig.: F23/2



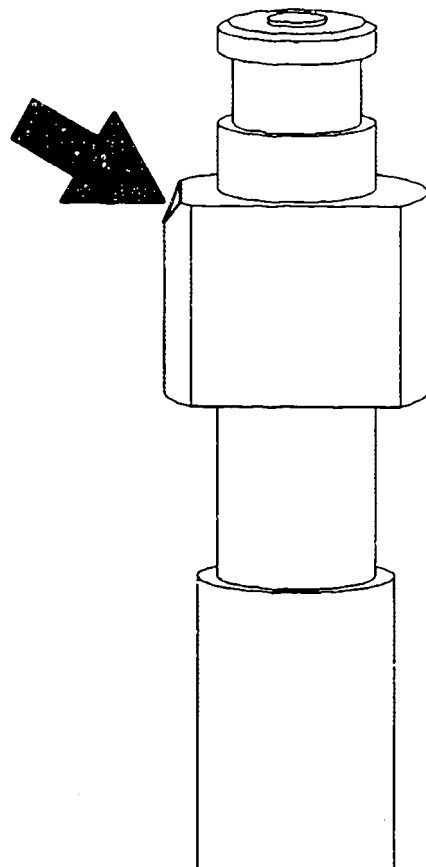
FUEL-INJECTION PUMP ASSEMBLY

Installing control sleeves:

Note position of assembly plungers
before inserting control sleeves:

Mark on plunger control arm
(see arrow) must be positioned in
direction of control rod.

Continue: F25/1 Fig.: F24/2



KMK05311

FUEL-INJECTION PUMP ASSEMBLY

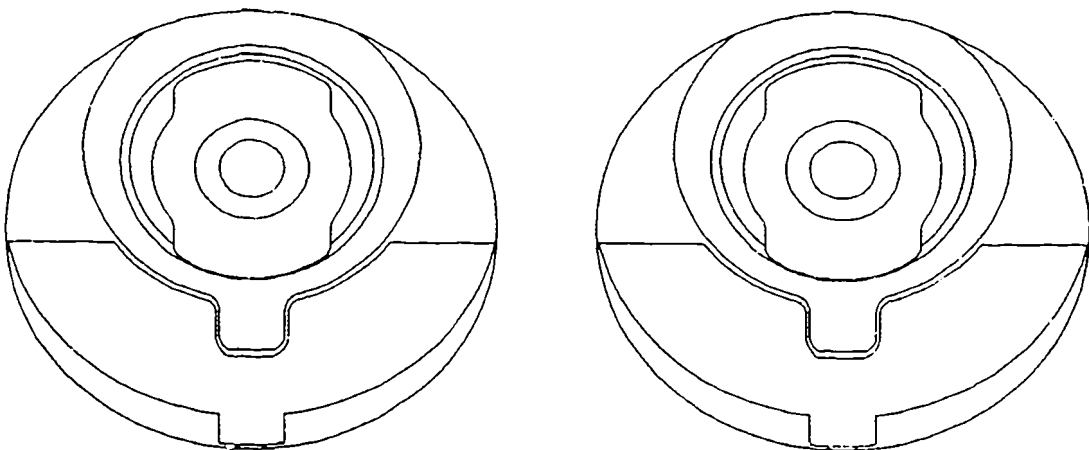
Installing control sleeves:

Insert control sleeves such that they are guided on assembly cylinder stem and engage with ball head in driver slot in control rod.

Repeatedly check freedom of movement of control rod during assembly (spring tensioner keeps return spring pretensioned).

Continue: F26/1 Fig.: F25/2

KMK05312



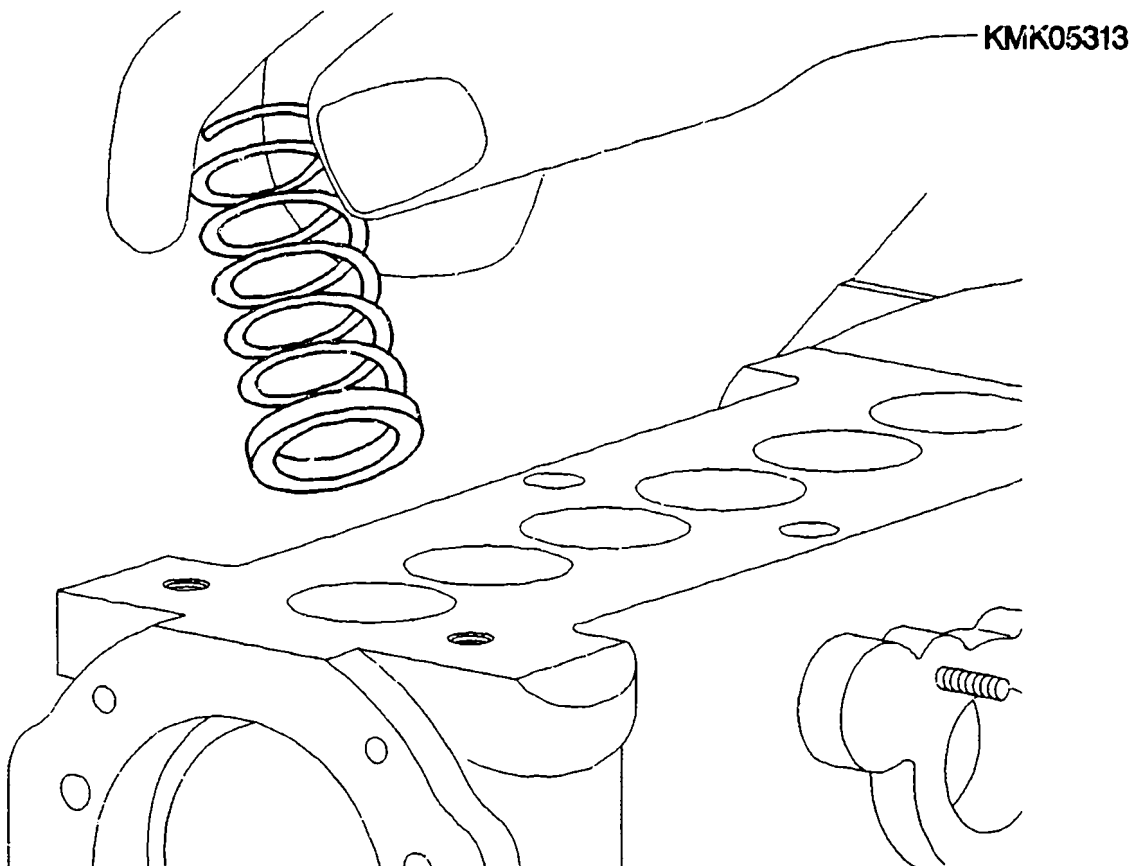
FUEL-INJECTION PUMP ASSEMBLY

Installing upper spring seats and plunger springs:

Before installing springs, apply molycote grease to roller-tappet guide holes.

Bond upper spring seat with small quantity of hot bearing grease to plunger spring and fit springs.

Continue: F27/1 Fig.: F26/2



FUEL-INJECTION PUMP ASSEMBLY

Installing lower spring seats:

Important: Assembly plunger must be raised slightly to engage lower spring seat. Only raise as far as absolutely necessary. If the plunger is lifted too far, it will slide out of the control lever. Re-insertion of the plunger with the assembly in situ is virtually impossible, i.e. assembly concerned has to be removed and almost the entire assembly procedure repeated.

Continue: F28/1

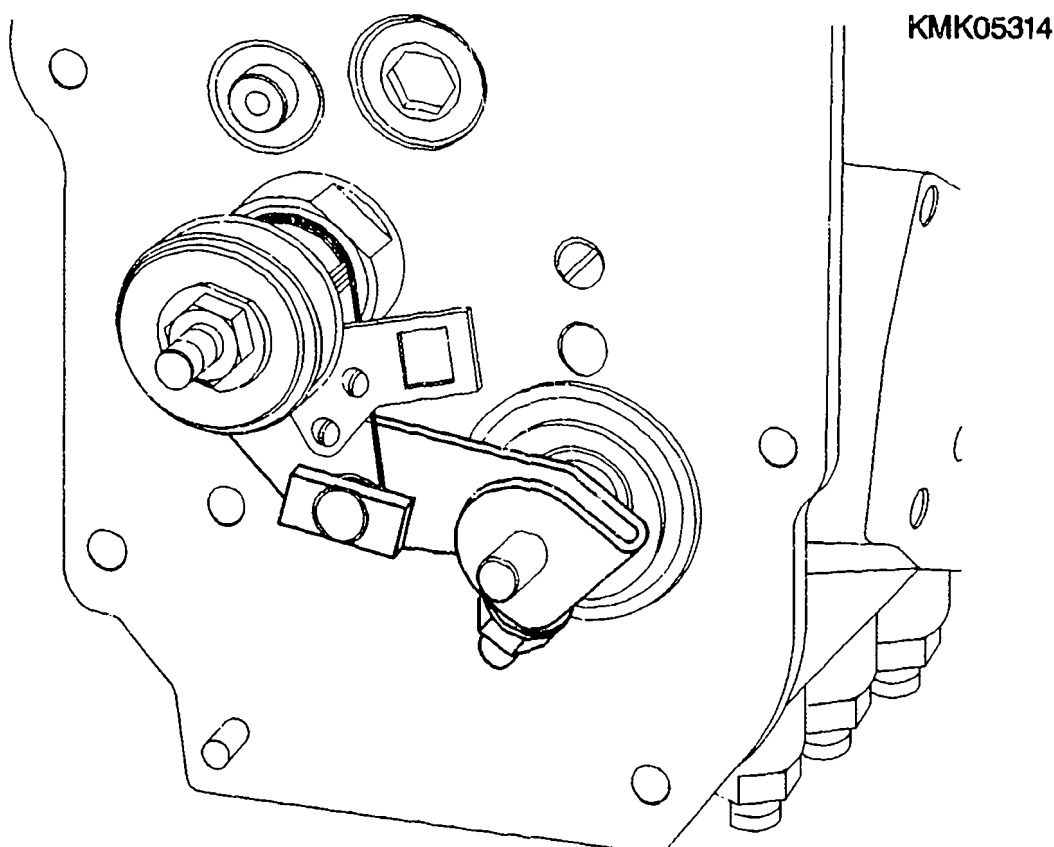
FUEL-INJECTION PUMP ASSEMBLY

Installing lower spring seats:

Position prestroke-shaft control lever in direction of control rod and block in this position with rubber band or wire.

The control levers are thus in their lower position (at top on account of reversed pump).

Continue: G01/1 Fig.: F28/2



FUEL-INJECTION PUMP ASSEMBLY

Installing lower spring seats:

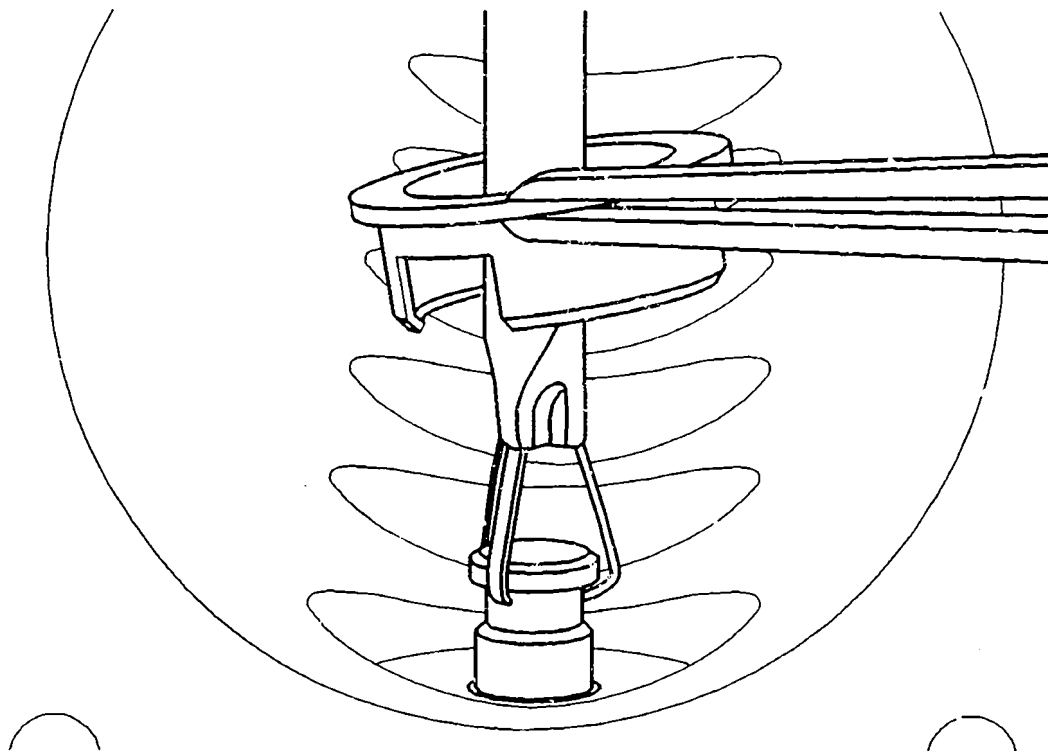
Use tweezers to insert spring seat in camshaft chamber. At the same time, guide commercially available claw-type gripper through openings in bottom and through spring seat.

Use the gripper to raise the plunger to the extent required for engaging the spring seat at the bottom of the plunger.

Release gripper. Press down plunger with spring seat and check proper positioning of spring seat on spring.

Continue: G02/1 Fig.: G01/1

KMK05315



FUEL-INJECTION PUMP ASSEMBLY

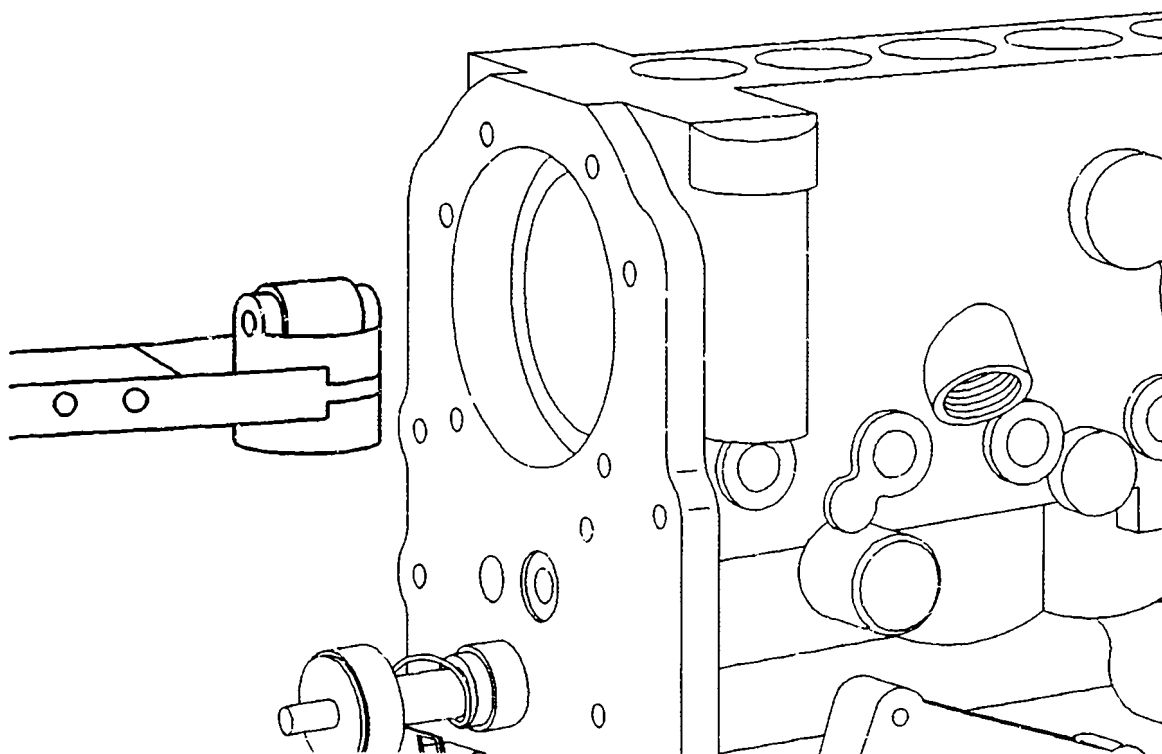
Installing roller tappets:

Apply molycote grease to bearing surface of roller tappets.

Use tappet forceps 0 986 611 298 to insert roller tappets in camshaft chamber and fit in guide hole such that tappet guide runs in housing guide groove.

Continue: G03/1 Fig.: G02/2

KMK05316



FUEL-INJECTION PUMP ASSEMBLY

Installing roller tappets:

Attach roller-tappet assembly device

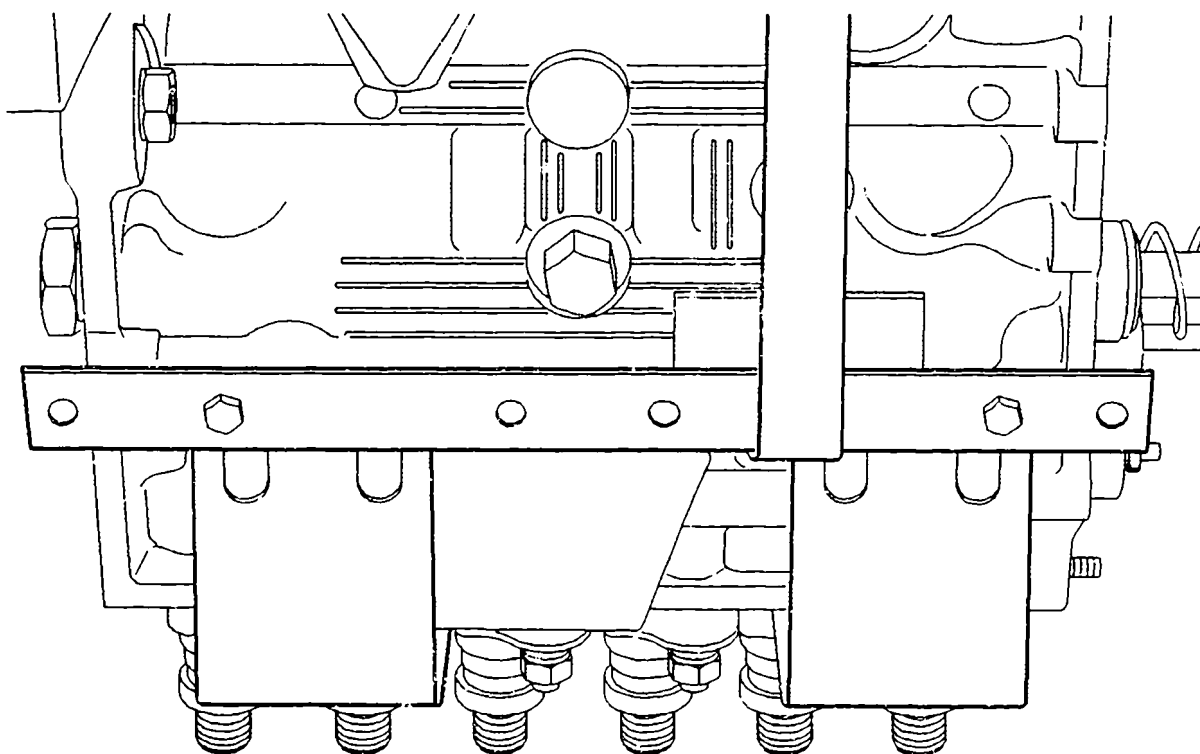
0 986 612 072 with angle holders

0 986 612 636 (2 x) to pump:

Unscrew the rear fastening nuts of the two outer barrel-and-valve assemblies in each case (back of pump = control-rod side) and use them to screw on the two angle holders. Screw the assembly device to the angle holders as shown.

Continue: G04/1 Fig.: G03/2

KMK05317



FUEL-INJECTION PUMP ASSEMBLY

Installing roller tappets:

Note: The procedure described in the following for roller-tappet installation must be performed with extreme care due to the possibility of sudden plunger spring relaxation and thus the DANGER OF INJURY.

Continue: G05/1

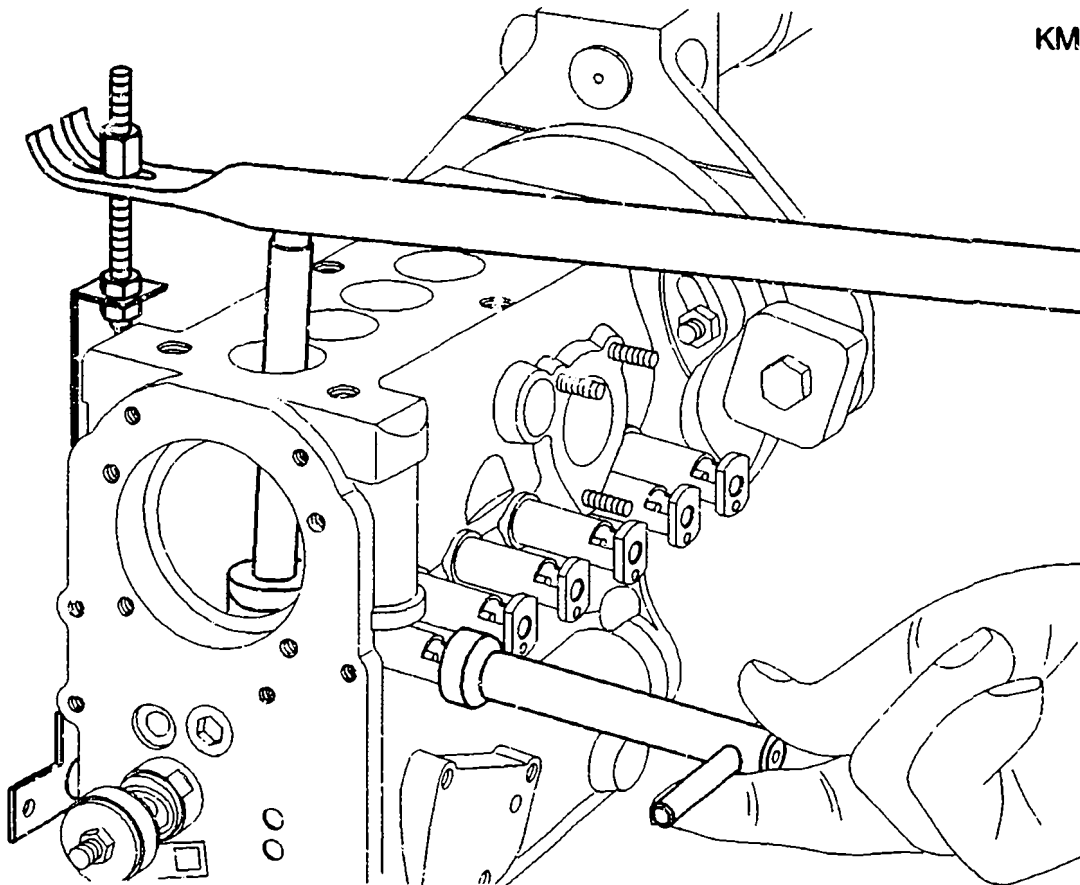
FUEL-INJECTION PUMP ASSEMBLY

Installing roller tappets.

Place appropriate number of tappet holders 0 986 612 482 in readiness (depending on number of barrels). Attach thrust pin of assembly device to roller-tappet roller. Position hand lever 0 986 611 993 with holes at bottom in assembly device and attach to thrust pin using one of the holes.

Continue: G06/1 Fig.: G05/2

KMK05318



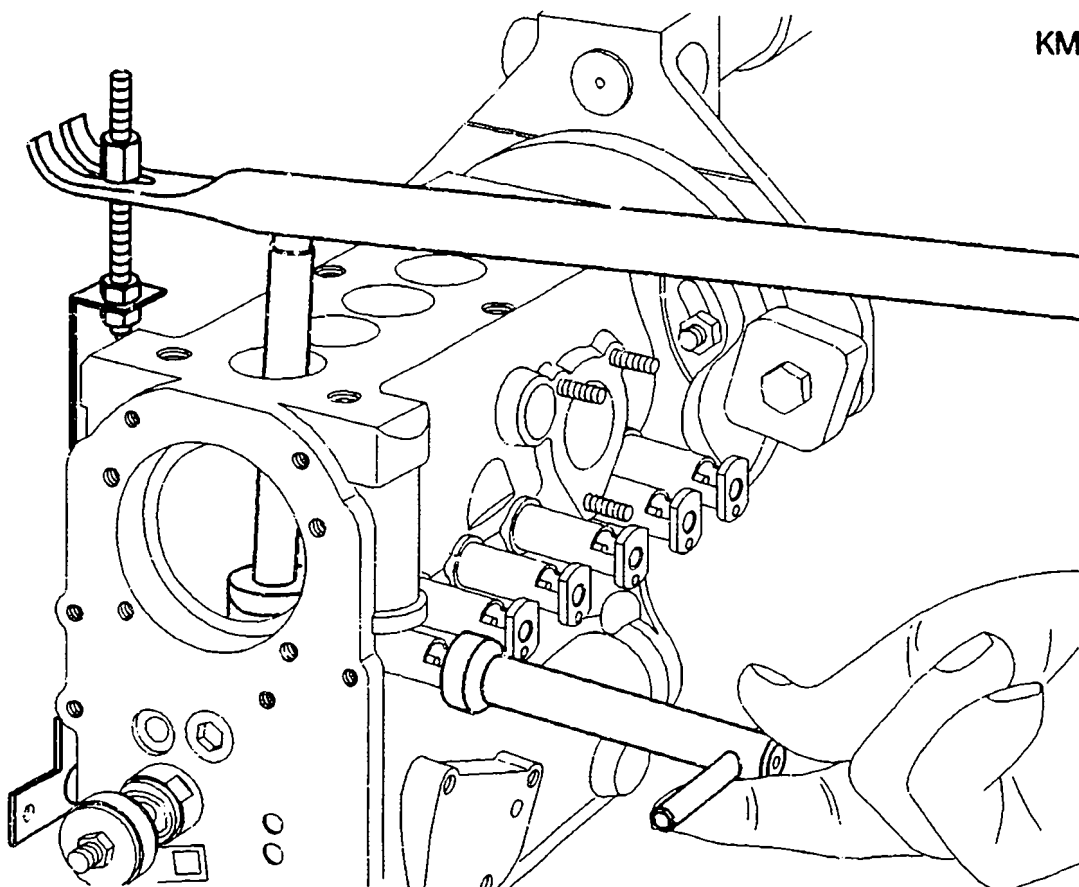
FUEL-INJECTION PUMP ASSEMBLY

Installing roller tappets:

Press roller tappet down (do not force) as far as it will go by pressing down lever and insert tappet holder in retention hole in housing. The milled surface faces downwards (towards top of pump) and the "0" on the eccentric shaft upwards (towards bottom of pump). Insert tappet holder as far as it will go. With handwheel pressed, turn eccentric shaft of tappet holder in clockwise direction by 180 degrees with socket wrench 0 986 612 489. Repeat procedure on all tappets and remove assembly device.

Continue: G07/1 Fig.: G06/2

KMK05318



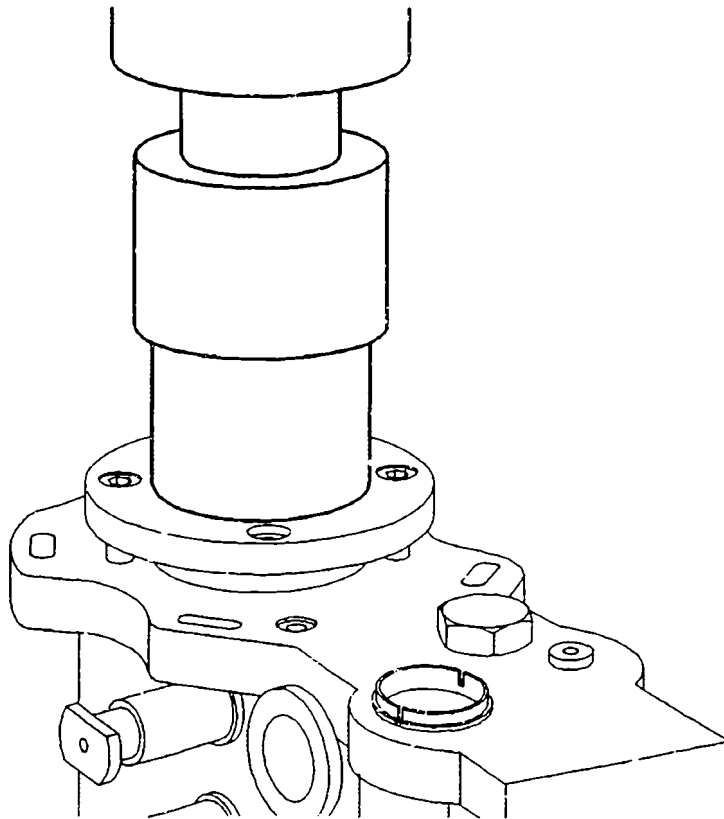
FUEL-INJECTION PUMP ASSEMBLY

Installing camshaft end shield on drive end:

Remove injection pump from assembly frame and position governor end on press. Attach new seal rings to end shield. Fit end shield (with cylindrical roller bearing); holes and threads coinciding and fixed with two screws. Press in end shield with pressing-in tool 0 986 612 647. Coat cleaned screws with Loctite 242, screw in and tighten to torque of 7...9 Nm (M 6) or 18...20 Nm (M 8).

Continue: G08/1 Fig.: G07/2

KMK05319



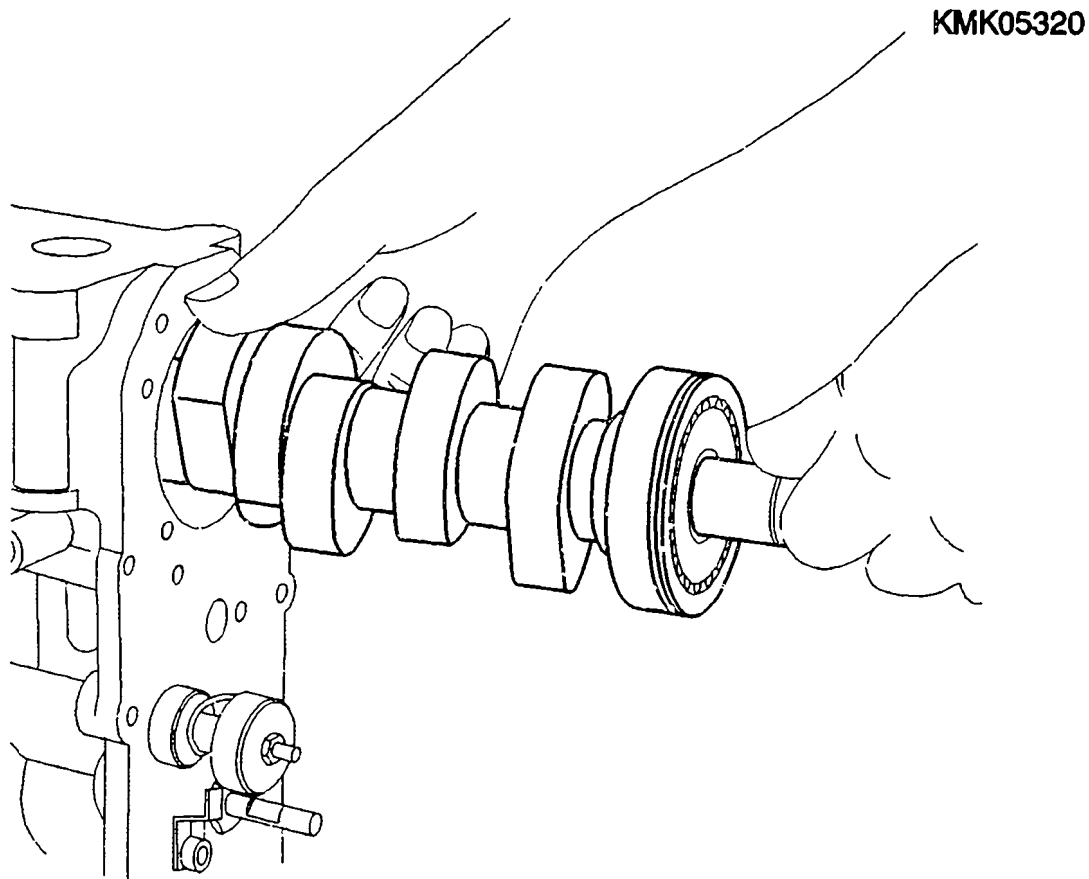
FUEL-INJECTION PUMP ASSEMBLY

Installing camshaft:

Bond camshaft intermediate bearing to camshaft using hot bearing grease. Insert shaft complete with intermediate bearing and governor-end bearing in pump housing. In the case of governor-end cylindrical roller bearing insert thrust ring into bearing seat.

Note: Hold outer race of cylindrical roller bearing, but do not pull off, as otherwise rollers would drop out.

Continue: G09/1 Fig.: G08/2



FUEL-INJECTION PUMP ASSEMBLY

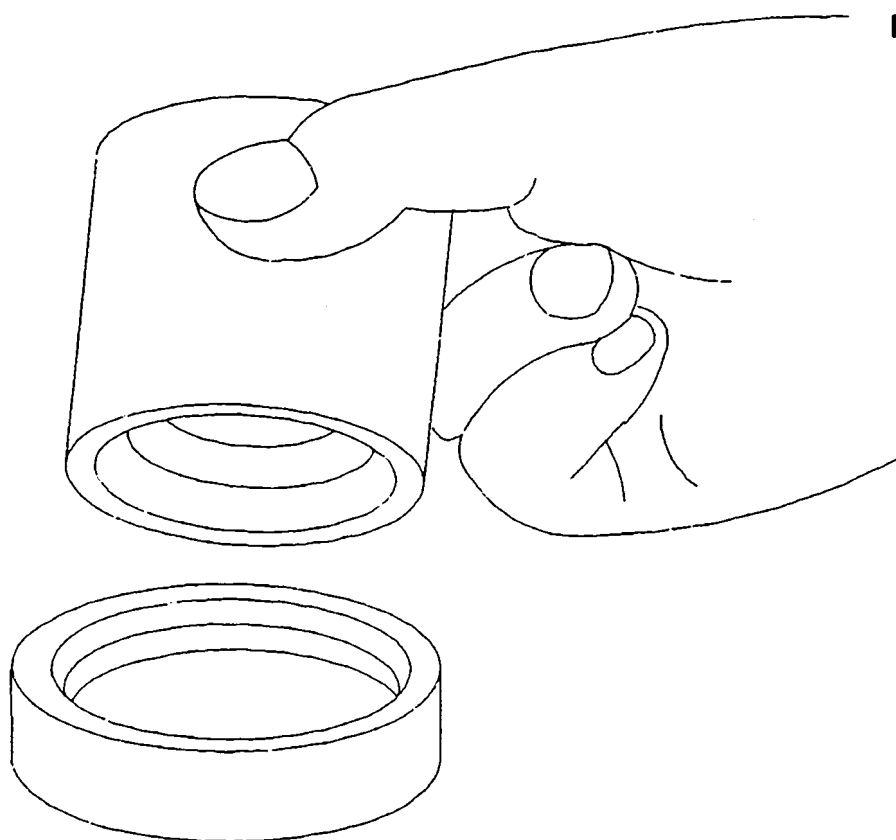
Installing camshaft:

Position drive end of pump on press.
Screw guide bushing 0 986 612 493 of
pressing-in tool 0 986 612 065 to
camshaft taper.

Place pressing-in tool over guide
bushing and position on bearing outer
race.

Note: Bearing OD 82 mm requires
additional use of adapter ring
0 986 612 646 (fig.).

Continue: G10/1 Fig.: G09/2



KMK05321

FUEL-INJECTION PUMP ASSEMBLY

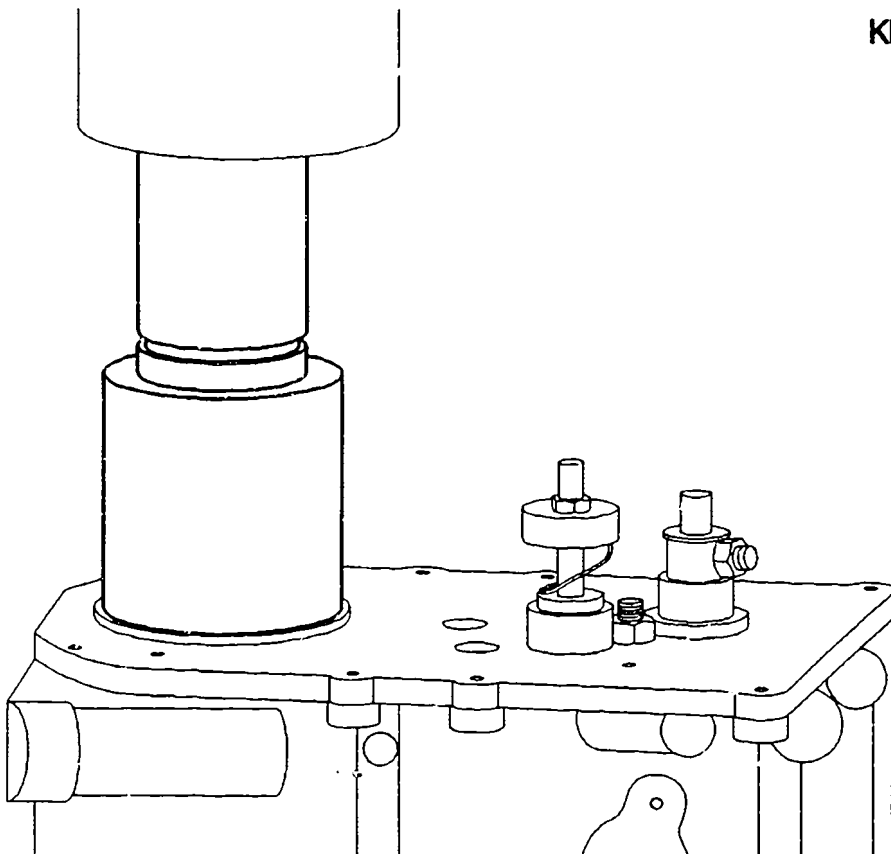
Installing camshaft:

Press bearing with camshaft into housing as far as it will go using pressing-in tool routed through guide bushing.

Note: The pressing-in force may only be exerted via the outer race. The outer race must not be tilted (requires particular attention with self-aligning roller bearing).

Continue: G11/1 Fig.: G10/2

KMK05322



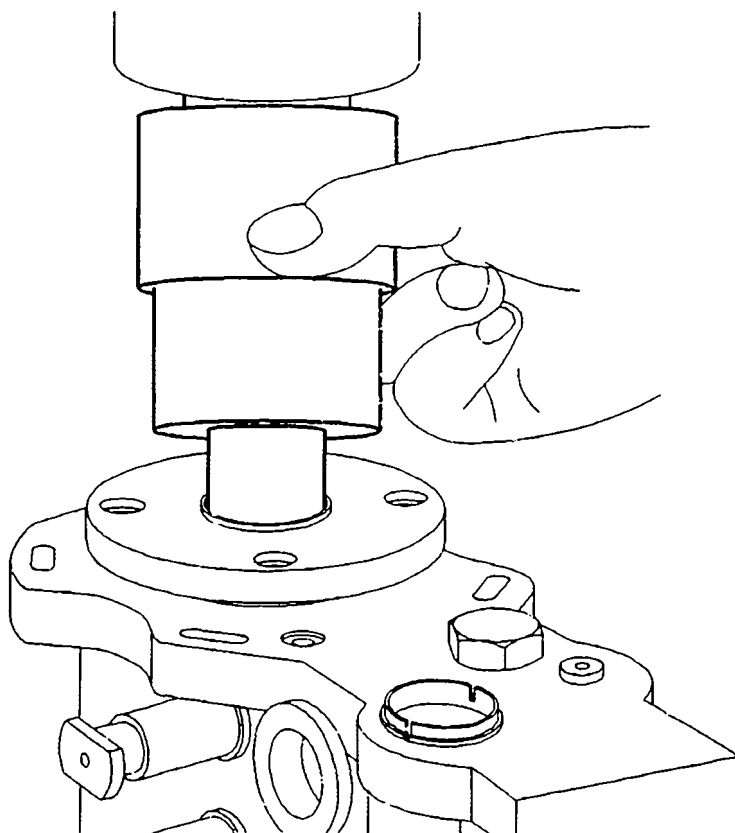
FUEL-INJECTION PUMP ASSEMBLY

Installing camshaft:

Position governor end of pump on press again. Guide radial-lip-type oil seal for drive-end bearing shield over camshaft taper and use pressing-in tool 0 986 612 647 to press flush into end shield.

Continue: G12/1 Fig.: G11/2

KMK05323



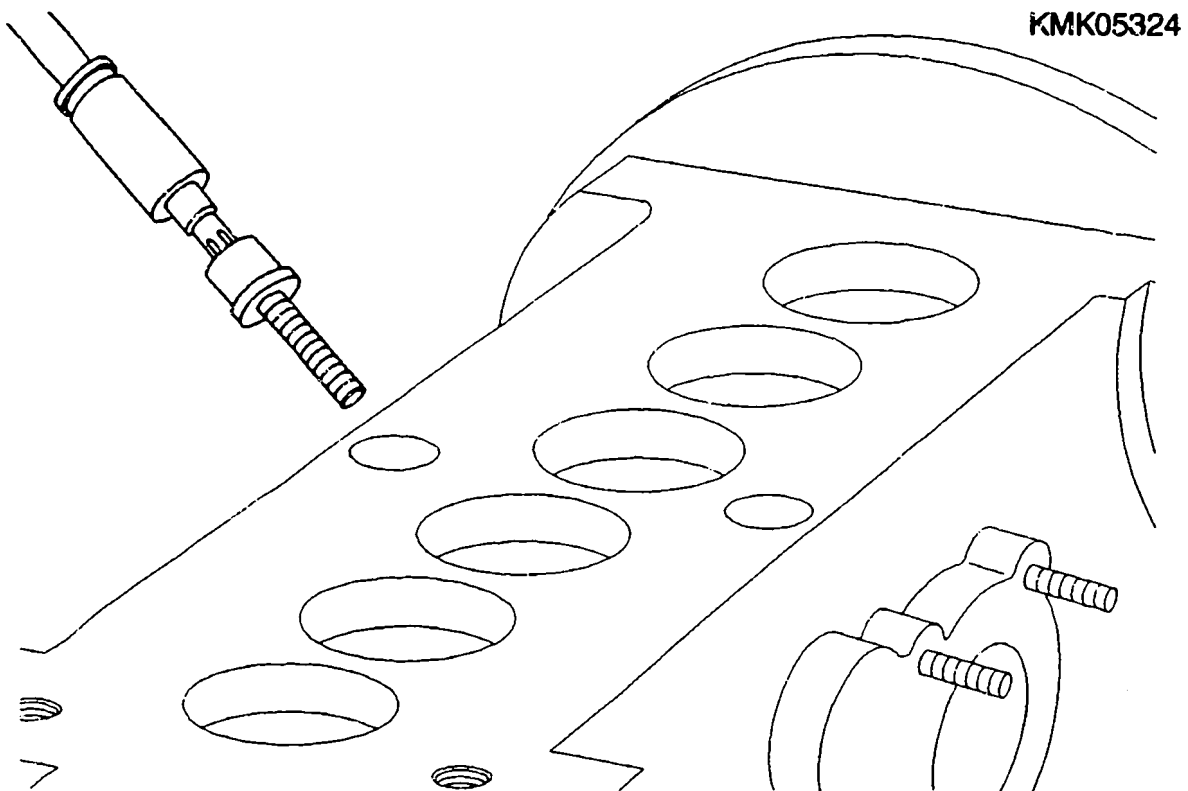
FUEL-INJECTION PUMP ASSEMBLY

Installing camshaft:

Re-attach pump to swivel-type clamping support and swivel down.

Align camshaft intermediate bearing through openings in bottom, screw in new fastening screws with new washers (special resilient sleeves) and tighten to torque of 10...12 Nm.

Continue: G13/1 Fig.: G12/2



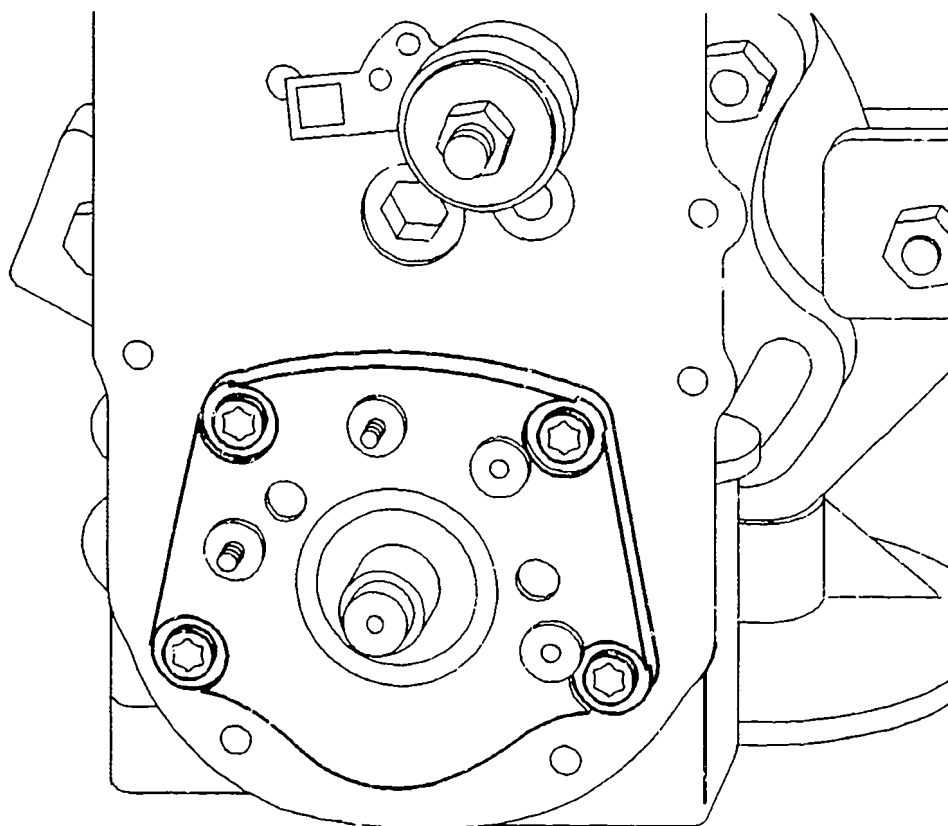
FUEL-INJECTION PUMP ASSEMBLY

Installing governor-end shield:

Attach end shield with new flange seal ring and new radial-lip-type oil seal and tighten fastening screws to torque of 7...9 Nm.

Continue: G14/1 Fig.: G13/2

KMK05325



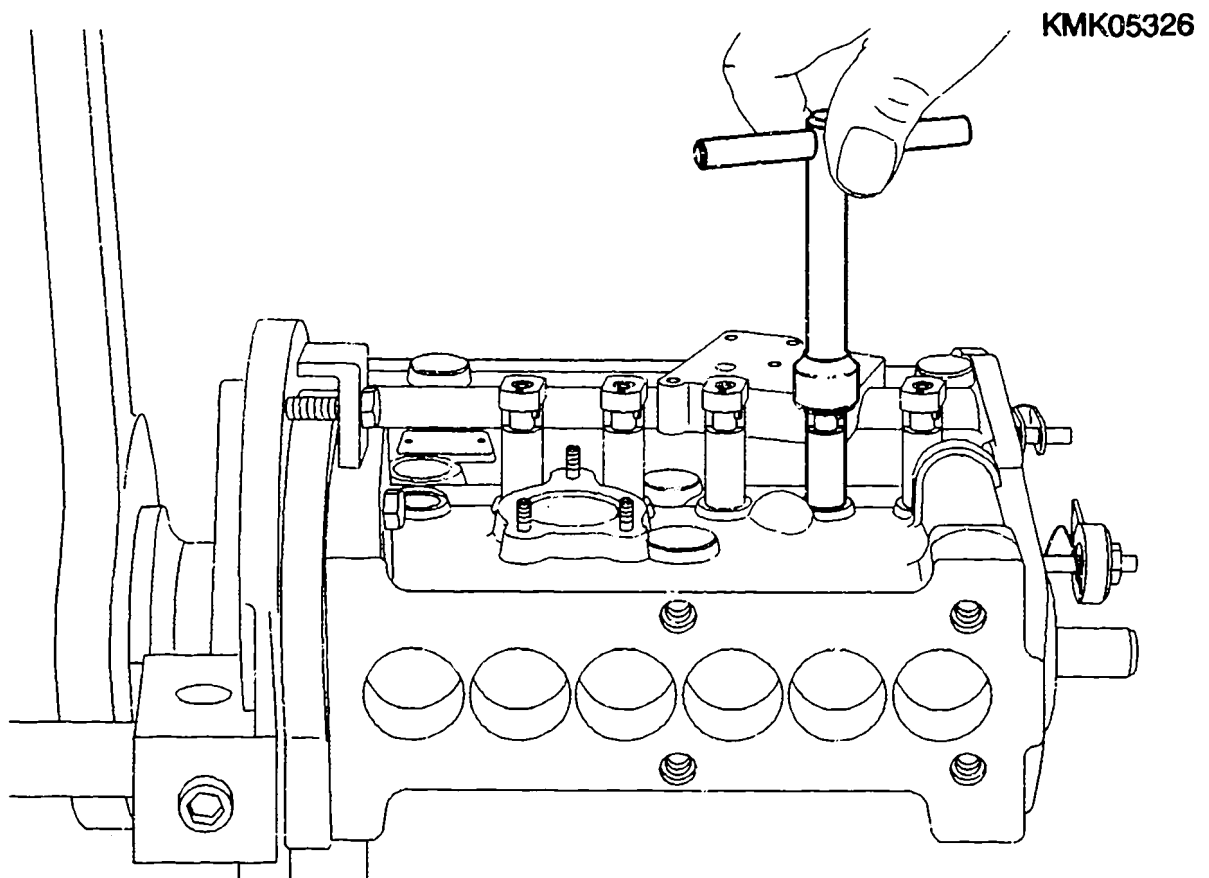
FUEL-INJECTION PUMP ASSEMBLY

Removing tappet holders:

Install drive coupling at drive taper of camshaft.

Consecutively turn the individual cams of the camshaft to TDC, use socket wrench 0 986 612 489 to turn eccentric shaft at corresponding tappet holder 180 degrees in counter-clockwise direction and pull tappet holder thus released out of retention hole.

Continue: G15/1 Fig.: G14/2



FUEL-INJECTION PUMP ASSEMBLY

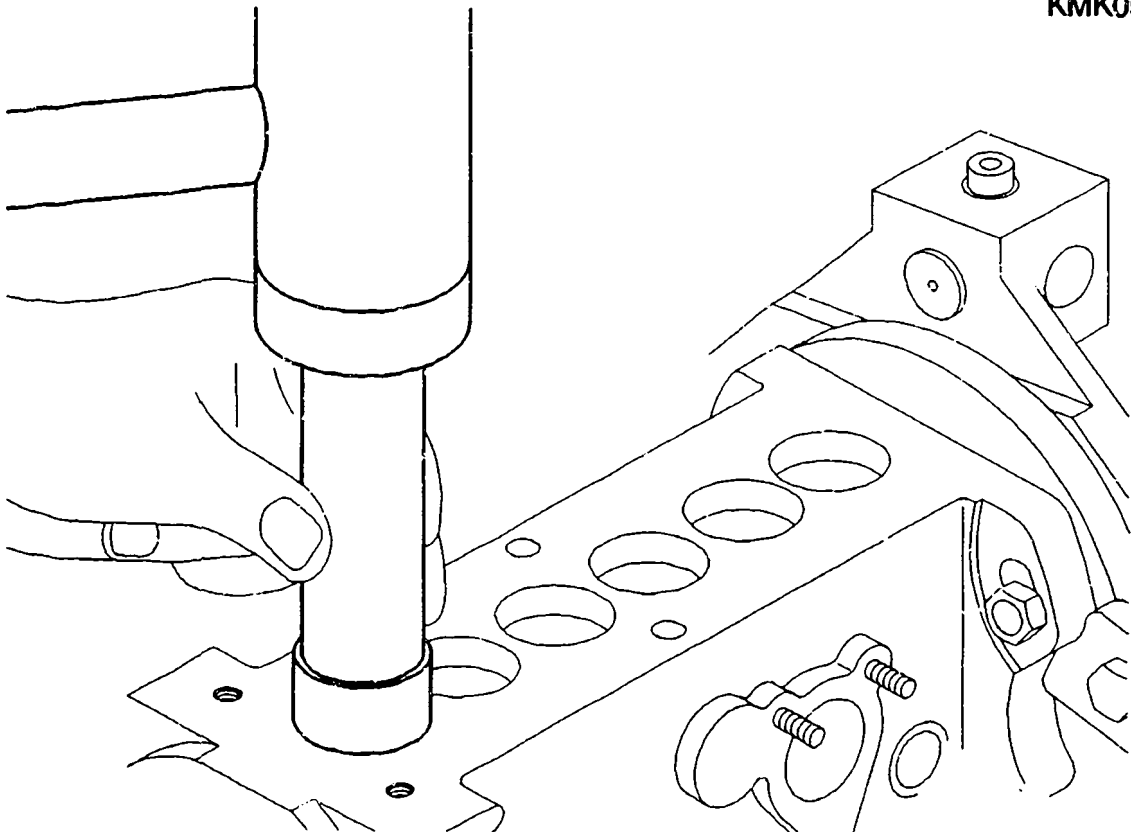
Installing bottom closure caps:

Note: Old caps are not to be re-used.

Fit new caps and use pressing-in mandrel 0 986 612 119 to press them flush into openings in bottom.

Continue: G16/1 Fig.: G15/2

KMK05327

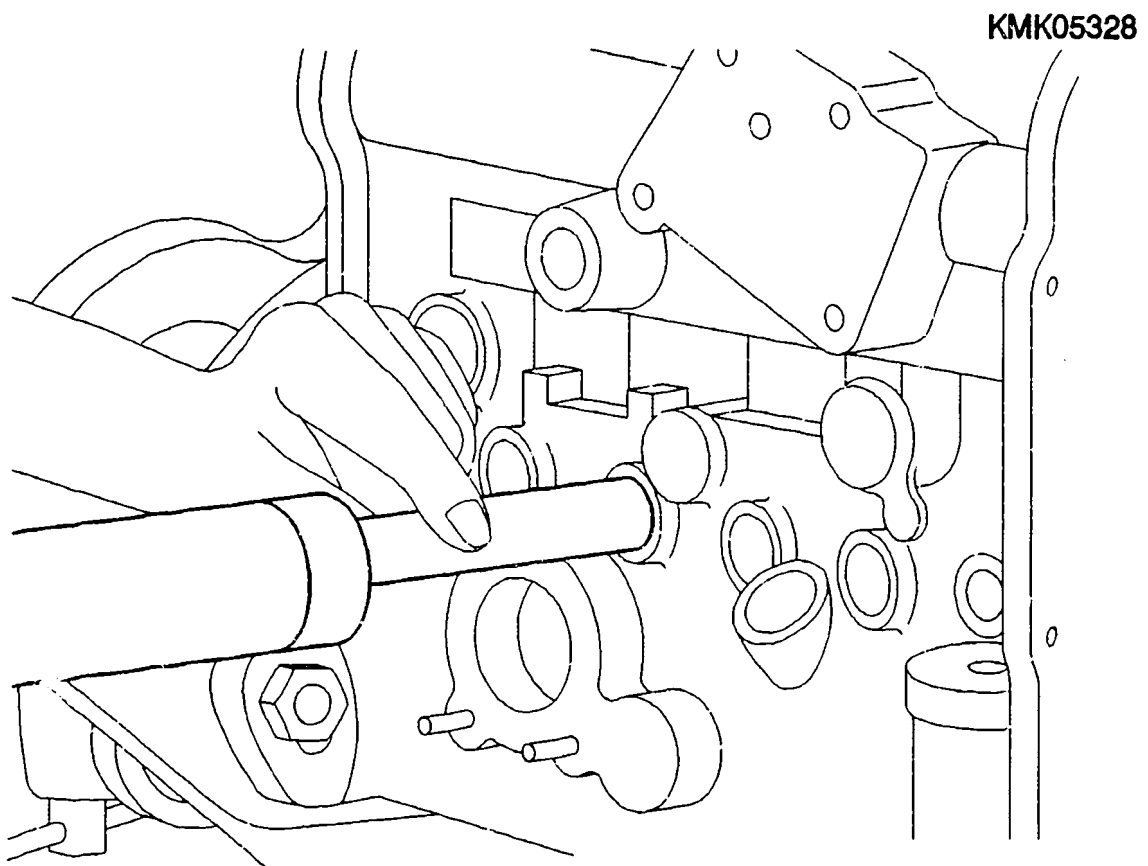


FUEL-INJECTION PUMP ASSEMBLY

Seal tappet retention holes:

Use pressing-in mandrel 0 986 612 156
to press new caps in flush.

Continue: G17/1 Fig.: G16/2



FUEL-INJECTION PUMP ASSEMBLY

Tightening fastening screws of barrel-and-valve assemblies:

Perform final tightening of fastening screws to torque of 60...65 Nm.
There must then be a uniform radial gap between radius of washer and delivery-valve holder.

Check freedom of movement of control rod.

Continue: G18/1

FUEL-INJECTION PUMP ASSEMBLY

Camshaft-chamber leak test:

Note:

To prevent possible skin irritation, apply hand cream before performing test and wash hands with soap and water afterwards. Where possible use rubber gloves.

Continue: G18/2

FUEL-INJECTION PUMP ASSEMBLY

Camshaft-chamber leak test

(does not apply to flange-type pumps with oil return bore in drive-end shield):

Seal attachment opening for supply pump (closing cover or supply pump).

Connect up the compressed air required for leak testing to a suitable connecting hole (e.g. hole for checking oil). Place pump in test bath; delivery-valve connections remain free.

Continue: G19/1

FUEL-INJECTION PUMP ASSEMBLY

Camshaft-chamber leak test:

Test pressure: 7 min. 1.5 bar, then
1 min. 0.5 bar.

Leaks, e.g. at sealing surfaces, screw connections, seal rings and end covers can be seen from air bubbles.

There must not be any air bubbles.

Continue: G20/1

FUEL-INJECTION PUMP ASSEMBLY

Finishing work on injection pump:

Note:

The pump is now ready for adjustment on test bench.

The remaining add-on parts including EHAB/ELAB, viscous oil pump, RE positioner etc. are to be kept with the pump and attached on adjustment and checking.

Continue: G20/2

FUEL-INJECTION PUMP ASSEMBLY

Finishing work on injection pump:

Note (continued):

If the pump is not to be adjusted immediately, it is appropriate to perform the following work.

In such cases the pump must be provided with a sign "not adjusted" until it is subsequently adjusted.

Non-adjusted pumps must never be fitted on engines.

Continue: G21/1

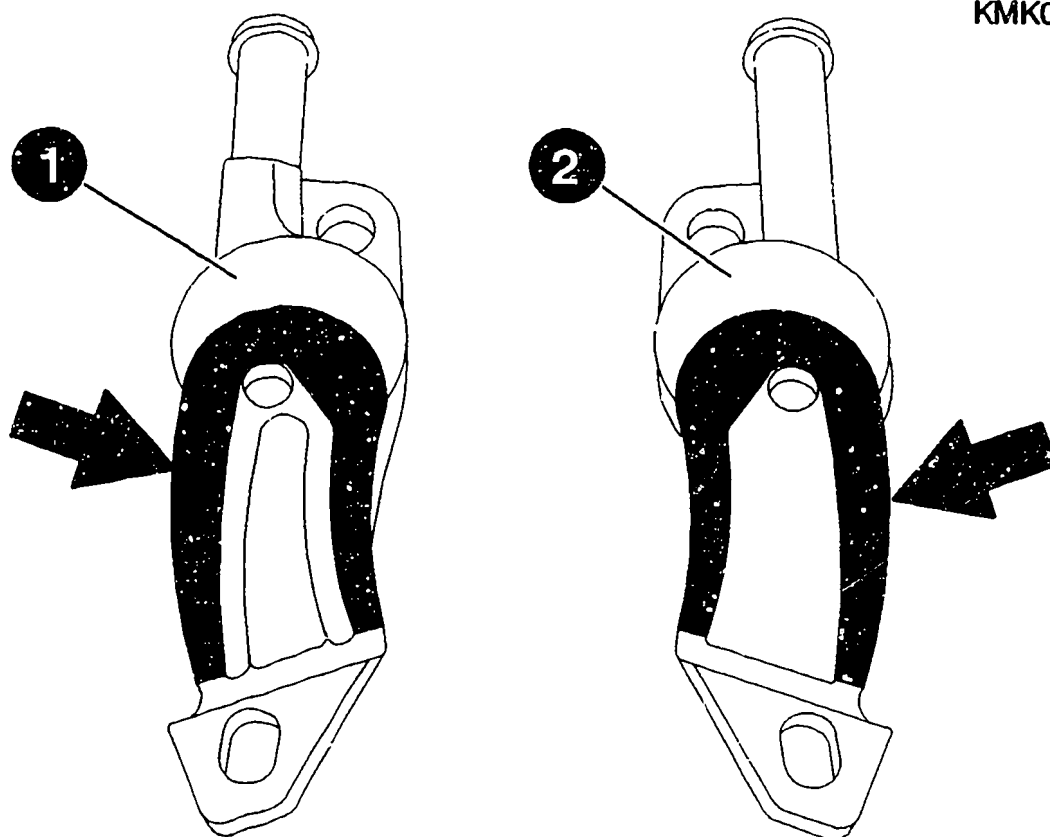
FUEL-INJECTION PUMP ASSEMBLY

Installing oil pump (viscous pump):

Note: Up until approx. mid 1994 oil pumps with different housing curvature were installed depending on the direction of rotation of the injection pump:

For counter-clockwise (fig. 1), mounted on left when viewed from disk cam side; mounted on right for clockwise (fig. 2). The corresponding oil hoses likewise differ.

Continue: G22/1 Fig.: G21/2



FUEL-INJECTION PUMP ASSEMBLY

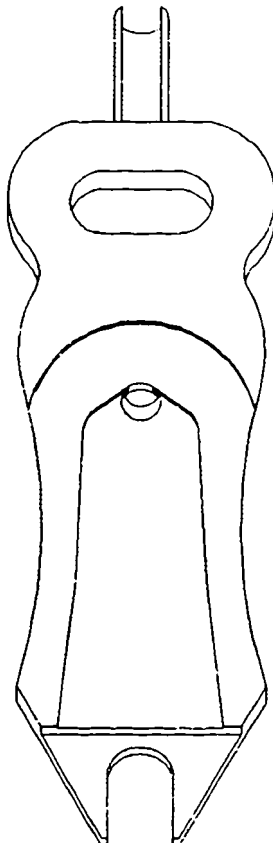
Installing oil pump (viscous pump):

As of approx. mid 1994 there is only one standard oil pump which is independent of direction of rotation. The correct installation side in line with the notes on the previous Coordinate is however still to be heeded.

The new version can also be installed in place of the direction-dependent version.

Continue: G23/1 Fig.: G22/2

KMK05292



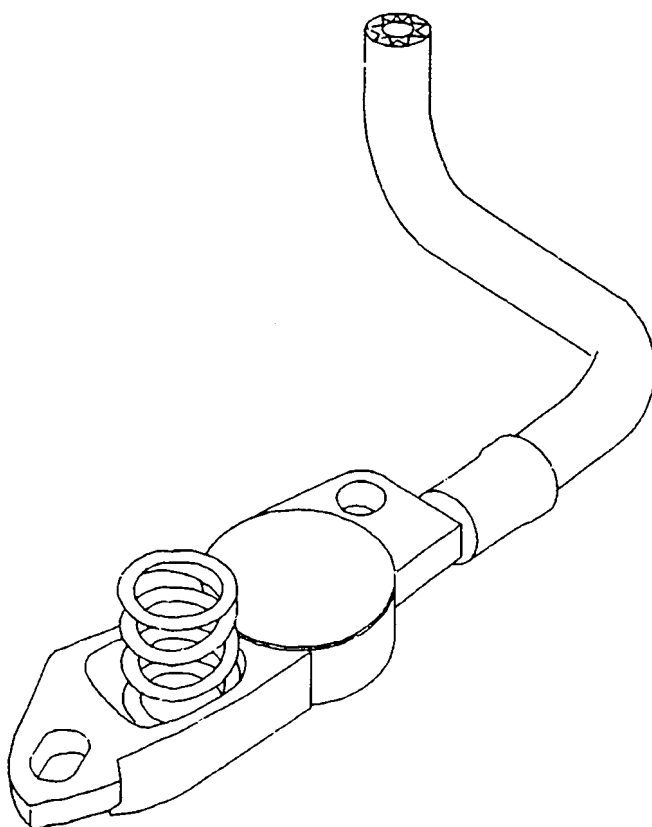
FUEL-INJECTION PUMP ASSEMBLY

Installing oil pump (viscous pump):

Note: Use cleaning agent to clean taper of camshaft, tapered hole in disk cam and fastening nut. Parts must be absolutely grease-free and dry.

Insert oil-pump spring with small quantity of hot bearing grease on back of pump.

Continue: G24/1 Fig.: G23/2



KMK01039

FUEL-INJECTION PUMP ASSEMBLY

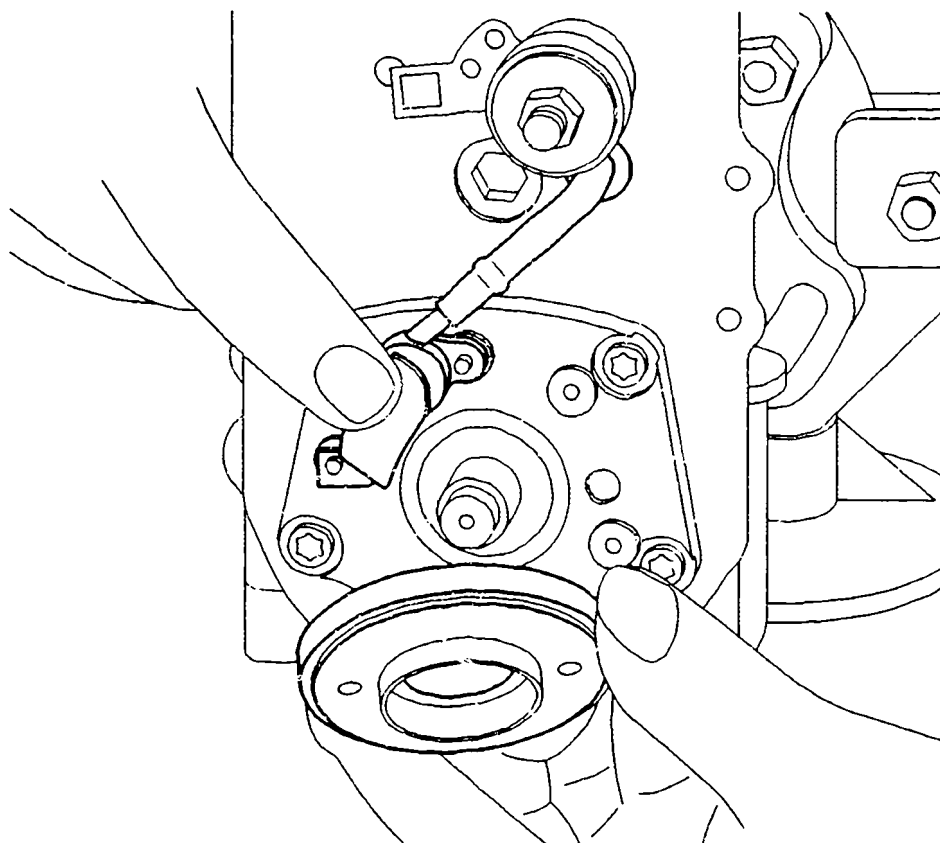
Installing oil pump (viscous pump):

Place oil pump on the two guide pins in the end shield and hold. Place disk cam on taper of camshaft and hold. Screw on nut and tighten slightly. (It should be possible to turn the disk cam on the taper during subsequent adjustment).

Check whether oil pump is pressed against bearing surface of disk cam by spring force and whether it is easy to move.

Continue: G25/1 Fig.: G24/2

KMK05329



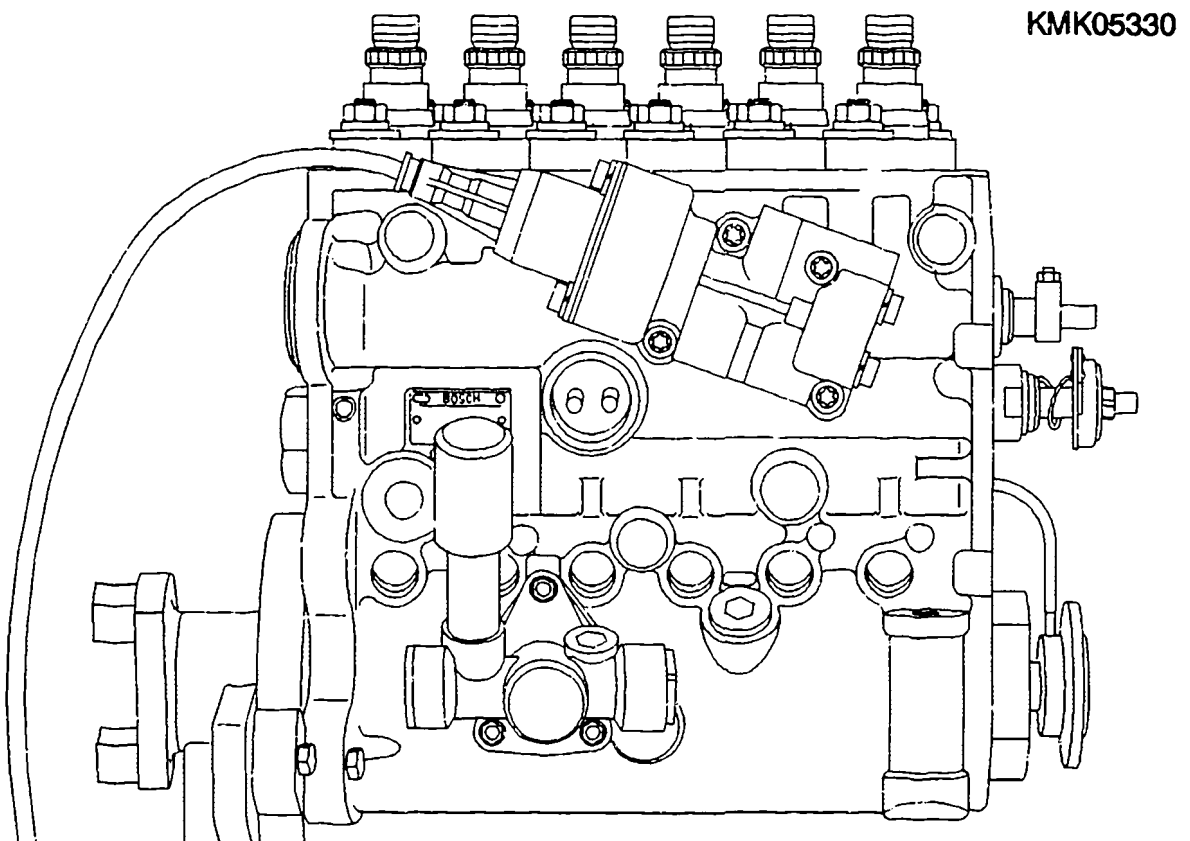
FUEL-INJECTION PUMP ASSEMBLY

Installing add-on components:

Fit EHAB/ELAB with new seal rings.
(Note cleaning of tapped holes and
microencapsulated fastening screws
as well as installation with
Loctite 242).

Fit supply pump, fuel temperature
sensor and all housing screw plugs.

Continue: G26/1 Fig.: G25/2



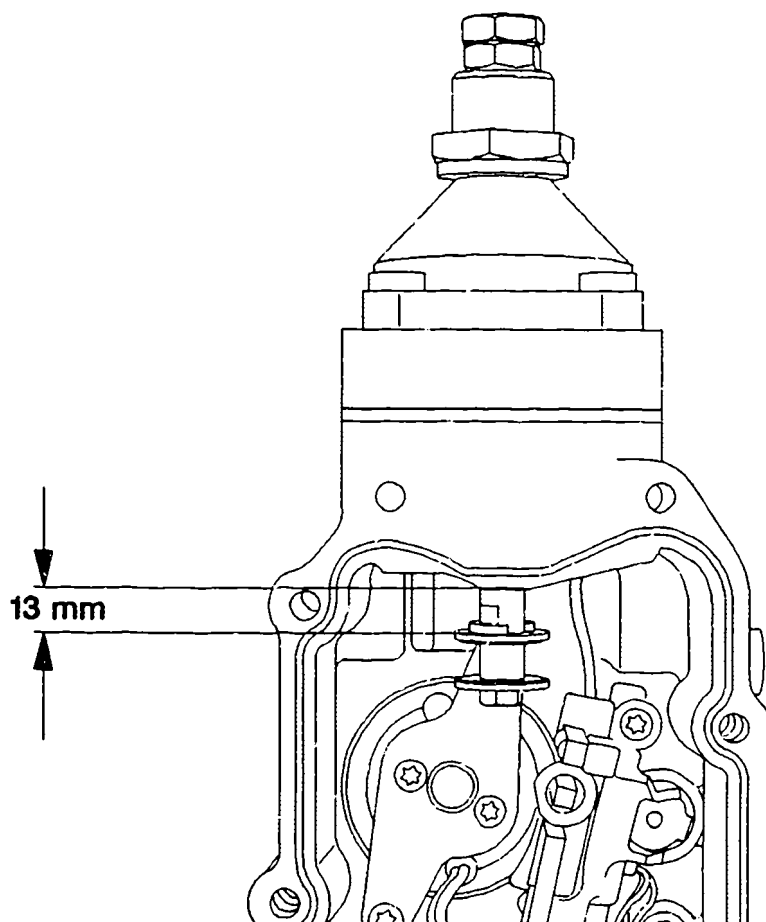
FUEL-INJECTION PUMP ASSEMBLY

Attaching RE positioner:

Unscrew housing cover over prestroke solenoid at positioner and screw on cover (tool) 0 986 612 676 in its place. Screw measuring device with adjusting screw 0 986 612 657 (without dial indicator) into tapped hole in cover.

Use adjusting screw to set armature such that distance between thread reel and housing is 13 mm (fig.).

Continue: G27/1 Fig.: G26/2



KMK05496

FUEL-INJECTION PUMP ASSEMBLY

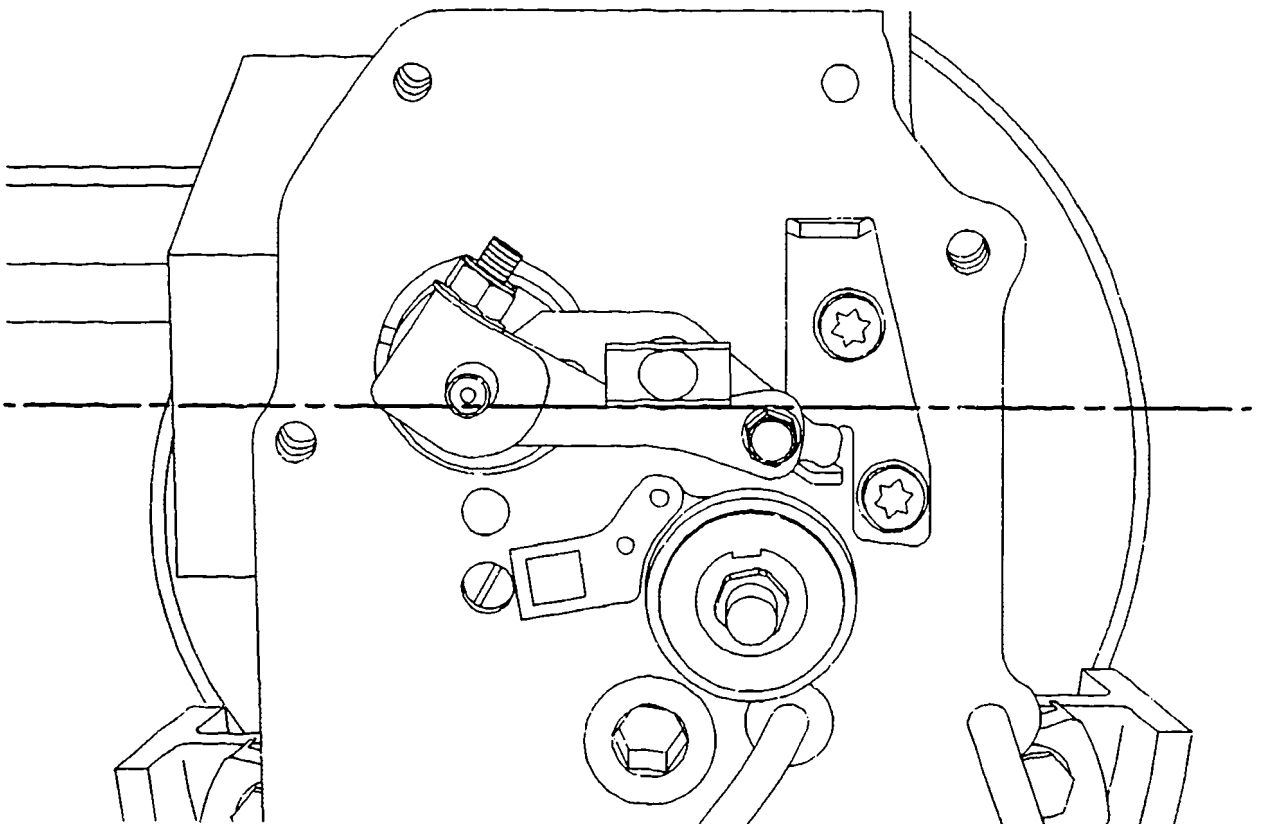
Attaching RE positioner:

Note: On positioners as of end of 1994 the housing cover over the prestroke solenoid is provided as standard with the tapped hole for the measuring device and sealed with a screw plug. Cover replacement is then not necessary.

Ensure that prestroke control lever on pump is on lower stop. Horizontally align (fig.) driver (propeller).

Continue: G28/1 Fig.: G27/2

KMK05484



FUEL-INJECTION PUMP ASSEMBLY

Installing RE positioner:

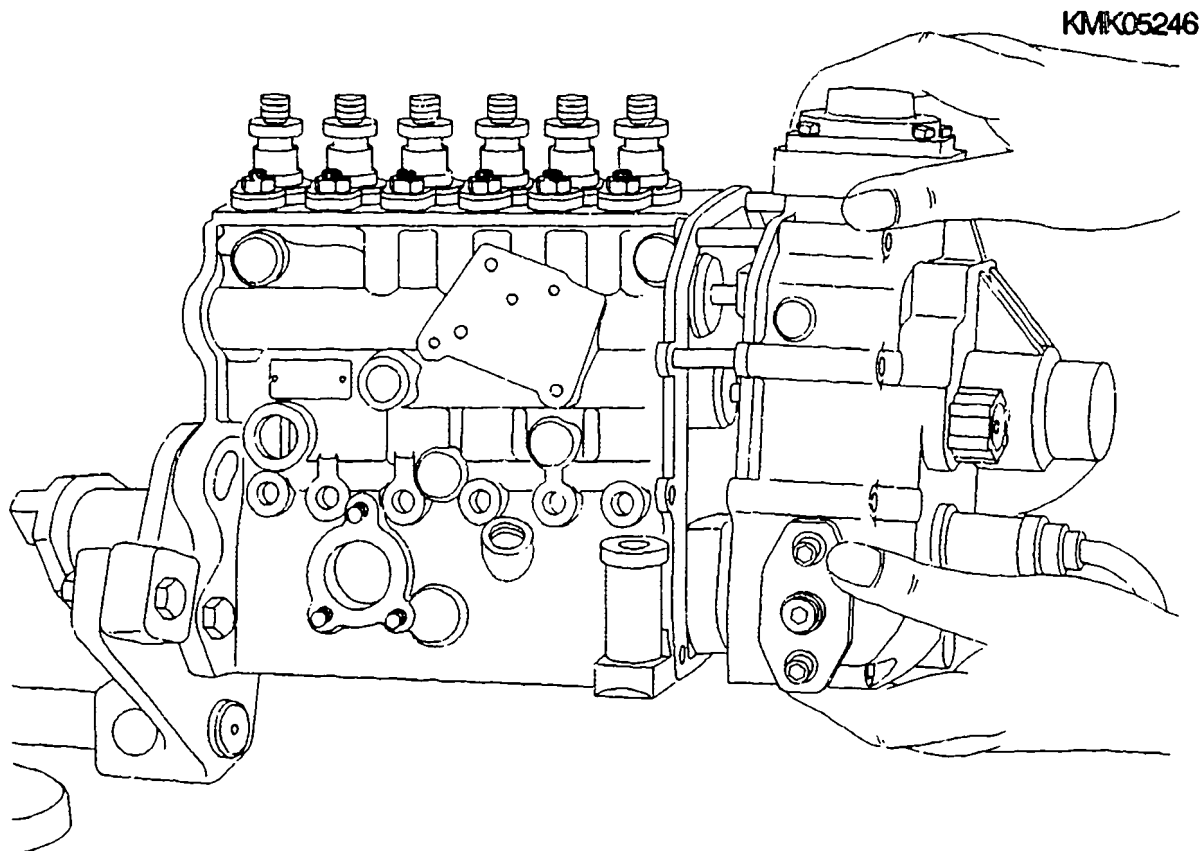
Attach complete positioner with new seal to pump:

Screw the two guide pins 0 986 612 598 opposite one another into two positioner fastening holes.

Fit positioner (guided by guide pin).

In doing so, insert measuring arm of RPS (without contact) into short-circuiting ring and horizontal guide (without force) into drive roller of prestroke solenoid. Press on positioner and screw in screws of free holes.

Continue: H01/1 Fig.: G28/2



FUEL-INJECTION PUMP ASSEMBLY

Installing RE positioner:

Screw out guide pin. Screw in remaining fastening screws and tighten to 7...9 Nm.

Continue: N27/1

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